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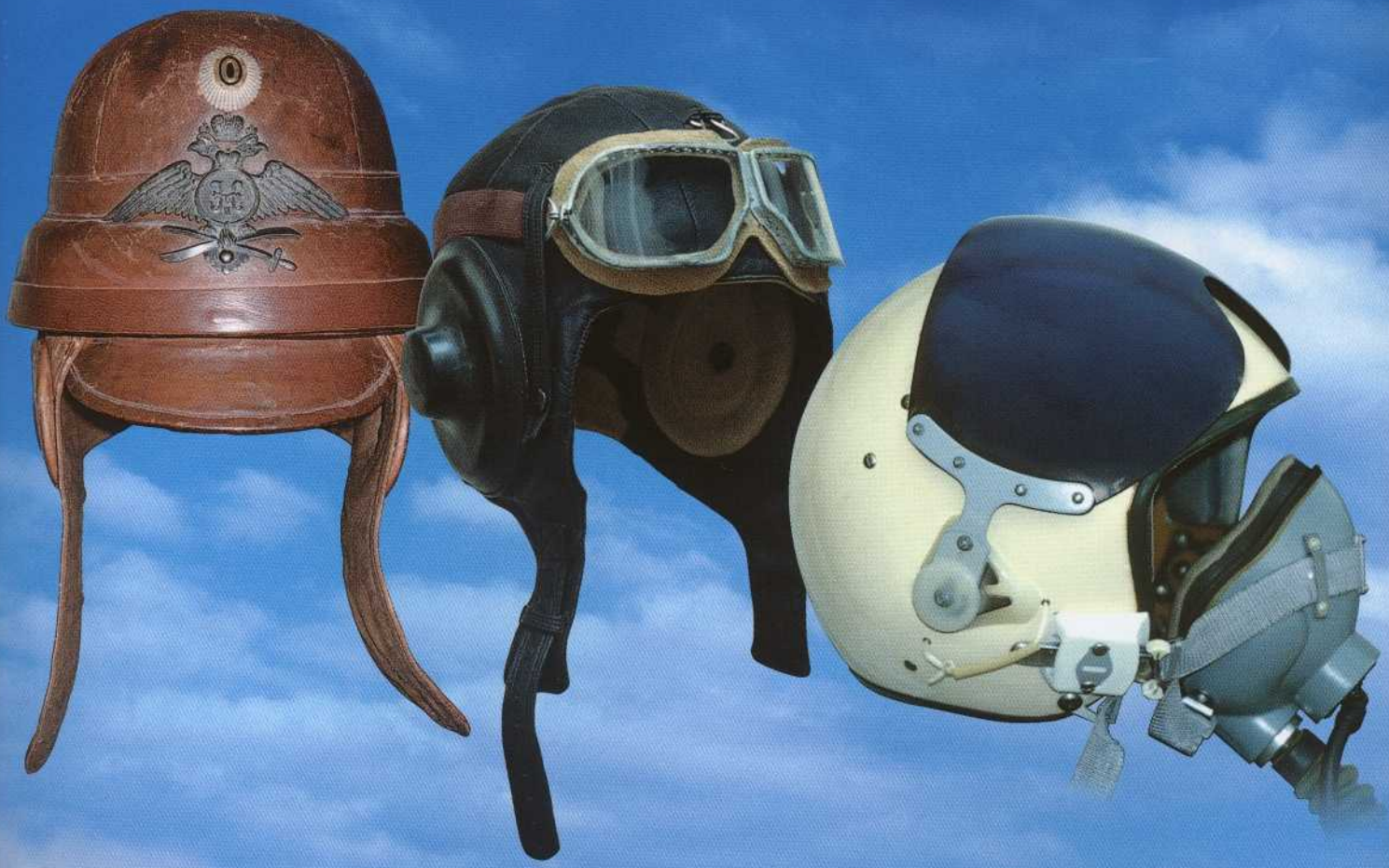

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FROM GOCHKISS TO SOYUZ: IS PAST EXPERIENCE REPRODUCIBLE?

The history of Russian-French cooperation in high technology areas counts many decades of years. Power transformations in Russia only suspended joint works or cooperation but never stopped them.

After the Crimean War ended during which French armour-clad floating batteries helped to seize Russian fortress Kinburn and French infantry marched into Sebastopol, the two states entered a period of lulled relations that eventually developed into the Franco-Russian Treaty (Entente) ratified in the late 1893 – early 1894 that lasted until 1917. The political rapprochement was followed by intensification of military contacts among which most important was military-technical cooperation, first of all in naval armaments. As a result, practically all warships built for the Russian Navy in 1890-1907 were armed with guns of Kanet and Gochkiss systems of 37-mm to 203-mm calibres. The most numerous family of Russian Borodino-class ironclads and Bayan-class armoured cruisers was based on French naval projects. Developments of Russian heavy field artillery on the eve of the First World War were greatly influenced by artillery pieces made by Schneider company.

During the First World War, in which Russia was involved as an ally of France, the Third Republic rendered considerable assistance to it by delivering a wide nomenclature of military equipment from aeroplanes to automobiles and helmets. It should be noted that many samples of French armaments and military hardware were manufactured (assembled) at Russian plants as well.

After the Revolution of 1917 everything seemed to be finished. It was totally out of place to speak of military contacts after French intervention and Russia's repudiation of czar's debts. But even in such complicated situation Soviet (already) and French engineers kept on interacting. Those were mixed interactions, including official procurement of some samples of armaments and military hardware and unlicensed manufacture of the most successful samples. It is a notorious fact that the first Soviet tank "Freedom-fighter comrade Lenin" (Russian Renault) was an exact copy of the captured French tank FT-17.

In the 1920s it was France's turn to take advantage of and familiarise itself with military items branded "Made in Russia", intended again for naval affairs. After the Soviet-French talks on ships and equipment of the Russian naval

squadron anchored in Bizert ended in failure, they were in part sold out, in part disassembled, but French could derive some, even if small, benefit by them.

The next rather important phase in high technology cooperation between the two countries was procurement by the USSR of French licenses on production of a wide gamut of aero-engines. In 1932 were bought licenses on production of liquid-cooled engines HY-12 Hispano-Suisa (designated M-100), radial engines Gnome-et-Rhone "Mistral-Majeur 14 Kdrs" (M-85 in the USSR) for combat aircraft, inverted row engines Renault "Bengazi" for sport aviation. It will not be an overstatement that Soviet aero-engines based on M-100 and M-85 designs made a backbone of Soviet Air Force during the Great Patriotic War. They powered the overwhelming majority of Soviet mass-produced fighters and bombers. There was an interesting episode connected with production of Soviet clones of Hispano-Suisa engines. In the late 1930s French leaders turned to the Soviet Government with the request for procurement of Soviet-made aero-engines for the growing French Air Force. Their request was denied due to lack of aero-engines even for domestic needs.

It was during the Second World War that French militaries had their first opportunity to employ combat materiel made in Russia/Soviet Union. In November 1942 a group of French pilots came to the USSR to fight in the Soviet-German front as representatives of the Free France. French pilots selected from the proposed Soviet, American and British warplanes the Soviet Yak-1 powered by M-105 engine, a derivative of the Hispano-Suisa. The Yak-1 fighters were subsequently substituted by the Yak-9s and then the Yak-3s. After the war the Yak-3 fighters were presented to France, and on 20 June 1945 40 aircraft landed at Le Bourget. That ferry flight made a swan song of the Soviet-French cooperation in sensitive and high-tech areas. With the advent of the Cold War samples of each country's war materiel were available for familiarisation only at the battlefields in local conflicts, and main actors in this area were intelligence officers specialised in military technologies.

As the USSR and France maintained quite normal relations, Soviet civil aviation systems made their first appearance at Le Bourget in 1967, and starting from 1989 – military as well. But the time for cooperation was not yet ripe. Only with the fall of the Iron Curtain and the collapse of the USSR mutual relations could start developing. And the French were let in the holy of holies of the Soviet Defence Industrial Complex – aerospace and nuclear industries.

Everything started on 7 February 1992 when the French Government recognized the Russian Federation as a legal successor to the USSR. And that year in November the Governments of the two countries signed "the agreement between the Government of the Russian Federation and the Government of the French Republic on cooperation in the areas of safe destruction of nuclear weapons and peaceful employment of released nuclear weapon-grade materials". That document stipulated several areas of joint work, such as: assistance in shipping nuclear weapons in the territory of Russia; assistance in destroying nuclear weapons in the territory of Russia; storage and employment of nuclear materials released during destruction of nuclear weapons; physical protection, registration and monitoring of nuclear materials.

It laid down the basis for subsequent agreements in the area of nuclear weapons destruction in the territory of Russia. The programme was generally referred to as AIDA (abbreviation from French – "aide au demantelement"), in short – assistance in utilisation.

It may seem strange but nearly all articles of this programme were fulfilled during a relatively short 8-year period. By 2000 main projects were completed. Thus, French taxpayers' money was spent to design and manufacture 100 so-called super-containers for safe transportation of nuclear weapons to bases of the Ministry of

The French Ariane will soon be neighboured by the Russian Soyuz at the Kourou cosmodrome

French pilots of the Patrouille de France aerobatic team were warmly received at MAKS 2003

Defence and enterprises of the former Ministry of Atomic Industry.

In 1993 France delivered to Russia specialised metal cutting equipment in accordance with the separately signed agreement on cooperation in the area of nuclear weapons dismantling.

A year later Foreign Ministers of the two countries signed another intergovernmental agreement on a key-turn construction at the expense of the French Side of the storage building for lithium materials released during dismantling of nuclear weapons. It was built at the Novosibirsk chemical concentrates plant by the end of 1997. Some experts estimated that the French Side invested into this project $20-27 mln. It is the most resource-intensive project from today's prespective compared with all other Russian-French projects.

However the palm of supremacy could have been intercepted by another Russian-French project that gradually outgrew its initial two-party format. It was the AIDA-MOKS programme aimed at upgrading Russian nuclear reactors VVER-1000 and BN-600 for using combined uranium-plutonium fuel with the plutonium part being a released weapon-grade plutonium. This project drew on French experience of using MOKS-fuel in water-cooled and water-moderated reactors in France. After a great number of Russian and French scientific research institutes and organisations had conducted studies of this problem, it was finally determined that Russia could utilize annually up to 1,300 kg of plutonium.

But as time drew near to decision-making on construction of a plutonium reprocessing plant in Russia the project did not succeed to receive a full-scale financing support during the G7 summit held in Moscow in 1996 (only 7% of the total $300 mln were promised).

Nevertheless, the research was continued and in 1998 the two-party programme AIDA-MOKS accepted Germany, making it a three-party AIDA-MOKS. Working panels were setup to assess costs for upgrading Russian reactors to MOKS-fuel and building reprocessing plants. The costs were estimated at $800 mln with additional $200 mln operational cost – and the work was stopped. In 2001 the AIDA-MOKS programme planned initially for a two-year period was finished.

On the whole, by the time of the G8 summit in the Canadian town of Kanansikis France had some $60-70 mln invested in various projects in Russia which was quite a decent result compared to other participants (apart from the USA). The summit adopted the programme of "Global partnership against proliferation of weapons and materials of mass destruction" envisaging a con-

The MiG-23 fighter is displayed in the aviation museum at Le Bourget

siderable increase of financing intended for destruction of weapons of mass destruction in Russia.

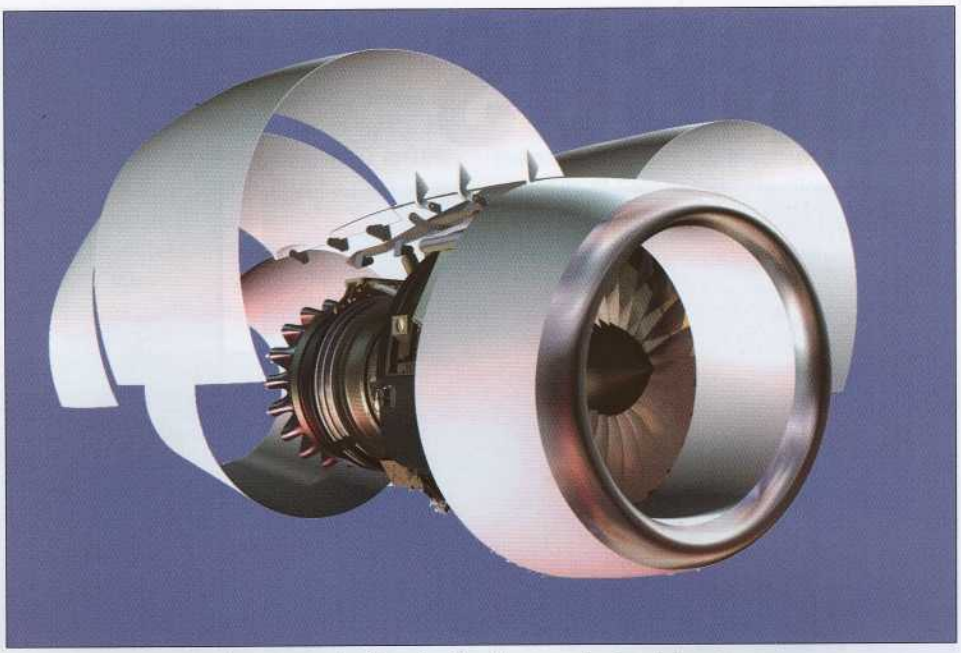
But the French decided to keep to their national traits: they were the last among G8 who declared the volume of planned allocations (750 mln Euro). It is known today that some 40 mln Euro have been allotted to the so-called Northern Dimension Environmental Partnership Support Fund. Furthermore, in 2003 French company SGN and Murmansk Sea Carrier signed an agreement on utilization of the Lespe floating technical tender used for storage of the used nuclear fuel from nuclear-powered ice-breakers and submarines.

Against the above background, which is not too bright, Russian-French cooperation in areas of conventional armaments and space technologies is totally lost. It is obvious that relationships in these areas are of different natures. However, when looking for tangible results we would find lots of words, declarations of intent, and initial working phases, rather than real accomplishments.

The Panhard armoured car is the first example of a western platform mounting Russian armament – the Kvartet antitank guided weapon system

The MiG-AT trainer became the most important joint project much advertised in the 1990s. After signing in 1992 of the Russian-French agreement on installation in the MiG-AT aircraft of the Larzac engines of SNECMA company and avionics of Sextan Avionics company (now Thales Avionics), the project was closely connected with the French. Failing to win in the bidding for trainer aircraft for the Russian Air Force and losing to its main rival – the Yak-130, MiG-AT designers found themselves in shallow waters. Later appeared projects for MiG-AT license production in Poland or its promotion as trainer aircraft for NATO countries. But notwithstanding "active preparatory work done by the French Side to promote the aircraft to arms markets of third countries" both the aircraft and its designers have nothing substantial to boast about. We speak nothing of the Larzac engine being an open competitor to the Russian RD-1700.

Another noisy project is connected with a setting up of a launch facility for Russian Soyuz launch vehicles at the Kourou cosmodrome in the French Guiana - the "Soyuz-Kourou" programme.



The SM146 engine is the latest example of Russian-French cooperation in aviation

Similar to the programme for destruction of strategic armaments, this space project is implemented on the basis of the intergovernmental agreement signed in November 2003. The project has an interesting funds allocation plan according to which 121 mln Euro shall be transferred via the French company Ariane-Space directly to Russian aerospace enterprises engaged in the project, and 193 mln Euro to European companies which are to develop the launching facility infrastructure. The first launch is scheduled for the end of 2006. Yet market prospects for this project do not seem overly bright if we remember that the main objective of its participants is to seize up to 45% share of the communication satellites market which has already been divided between several operators and is basically saturated. How much the Soyuz-Kourou will be able to bite off remains to be seen.

The French Ministry of Defence projects for procurement of the Russian-made Krasnopol guided artillery munitions and joint development of unmanned aerial vehicles remain at planning levels. There are some positive results as regards joint marketing of armaments and military hardware in the third countries' markets. Thus, French-made thermal vision sights of Thales Optronics are installed in the Russian tanks T-90S supplied to India, T-80U (Cyprus) and infantry fighting vehicles BMP-3 (Kuwait and Republic of Korea). Some positive potential has been attained in upgrading Soviet/Russian-made aviation materiel, such as MiG-21 fighters, Mi-8 and Mi-24 helicopters. Yet there are only few examples of joint works in the opposite direction – procurement of Russian equipment for French war materiel. One of the most sensational example has been installation of the navigation electronic mapping system made by Tranzas company onboard the Charles de Gaulle aircraft carrier. Another well-known example is the French armoured car Panhard armed with the Russian-made Kvartet antitank weapon system. It has been displayed at several defence exhibitions. In spite of these individual achievements it is a losing game in total for Russians.

One more example of Russian-French cooperation in hi-tech sectors is joint development by Snecma and Saturn companies of the SM146 turbojet engine for advanced Russian regional jet RRJ jointly developed by Sukhoi Civil Aircraft, Ilyushin and Boeing. It must be noted that Snecma and Saturn closely cooperate in implementing the programme tasks, such as engine design, manufacture, customer services and maintenance. But the trouble with the SM-146 consists in its strong dependence on the RRJ programme. Should the latter slip or delay, the engine's future would be strongly compromised.

In totalling Russian-French cooperation in such highly sensitive areas as nuclear power generation and aerospace one cannot help noticing that unlike previous rather successful contacts in the past (both in the Czar times and in the early Soviet years) modern-time cooperation has a lop-sided quality. Only a few projects have been successful in "conventional industries" including disarmament, and only those characterised by relative inexpensiveness. They were finalized in the 1990s while the first five years in the new century are marked with a peculiar pause in this area.

One would like to hope that the big plans put on the agenda won't be stuck at information cluttering and politicking games level as their implementation most fully corresponds to national interests of Russia, both in the economic and security areas.

Andrei FROLOV,
Editor,
"Nuclear Monitor: Information" Newsletter

AIRBUS

& BOEING:

A DISPUTE NEVER SUBSIDING

Airbus and Boeing dream of leaving one another without subsidies

The USA submitted a request to the World Trade Organization (WTO) to set a panel for examining the EU subsidies provided for Airbus. The same day European Union retaliated with the cross complaint also addressing subsidies – of the US government to Boeing. Experts believe this dispute will become the biggest trade battle in the WTO history.

Aircraft wars across Atlantic have been waged for two decades already. Since 1992 when the two sides signed an agreement on limiting the government support to Boeing and Airbus, they never stopped accusing one another of violating the agreement. Last October the US filed a case with the WTO against Airbus, accusing it of getting $15 bn illegal EU's subsidies and threatening to drop out of the agreement. The European Union also filed a case accusing the US government of subsidising Boeing. Experts pointed out that it was not by accident that flaming up the conflict coincided with the US presidential campaign, in which George Bush, head of the state, stood up by Boeing.

In January, one month before the European tour of the US President, the two sides agreed to resume talks and try to settle the problem without involving the WTO. But the US soon declared that the talks reached a deadlock, and on 31 May 2005 filed a WTO case against the EU accusing governments of the UK, France, Germany and Spain of subsidising illegally Airbus. According to Rob Portman, the US Trade Representative in the WTO, the US appeal was forced by the EU plans to provide a $1.7 bn aid package for Airbus. The WTO case was filed just four days after Peter Mandelson, the EU trade commissioner, had proposed to reduce aid to the Airbus A350 by 30%. The US officials see this as a retreat from a pledge to eliminate subsidies. Washington is now set to challenge via the WTO legitimacy of all subsidies provided by the EU for Airbus during its 35-years existence.

The US insist on illegality of a new aircraft launch aid: Airbus does not pay interest on the EU credits, or pays too little interest - only if the model is merchantable. The EU rejects these accusations stating that Airbus receives aid in the form of loans, not direct payoffs prohibited by the WTO rules, and brings profit to the governments, therefore such aid should be considered as investments not subsidies. Airbus has informed that during the past 13 years it has paid off to the European governments a total of $6.7 bn, by 40% surpassing the volume of loans received. The EU opines that Boeing has received since 1992 about $29 bn of the US government

subsidies in the form of tax preferences, export duty reductions, research and developments funding, and support from Japan. According to Airbus, the Boeing 787 development was supported with about $5 bn of hidden subsidies.

Under the WTO rules, the sides should conduct consultations to reach a compromise during 60 days after filing the case. Otherwise it is passed to a special panel with final decision to be taken in 18 to 24 months.

In case of the dispute aggravation the both companies will most likely be on a losing side: the WTO may judge subsidies to both parties illegal, making production costs to rise. By the way, such decision was taken by the WTO in 1996-1997 on the cross claims filed by Canada and Brazil against illegal subsidising of Bombardier and Embraer companies. It did not avert Canada and Brazil from continuing financial support for their companies though.

It is not improbable that the battle of giants will play into hands of their minor competitors. If the WTO applies sanctions against Airbus and Boeing, the cost price of their aircraft will inevitable rise, and, as a consequence, market positions of Canadian Bombardier and Brazilian Embraer will be reinforced. The two companies dominate the smaller passenger aircraft segment, and are gradually gaining muscles in medium-haul sector.

"This case puts the WTO capabilities to a serious test"

Robert Carbaugh, Professor of Economics at Central Washington University, answered questions of the Russian national business Newspaper Kommersant:

Can it be that the US claim is timed with Paris Air Show to poison Airbus's performance there?

Indeed, the US filed the case close to the opening day of the Air Show. But the main reason is different: Boeing expects the European governments to soon announce another $1 bn granted to the new Airbus A350, a competitor for the new Boeing 787. Boeing sees it as a violation of former agreements on subsidies between the two companies.

What repercussions may have this case?

It is hard to say how this dispute will be settled: the WTO may judge subsidies to both companies illegal. I think Boeing has some advantage in pleading its case: it can show a notable decline of sales and profits within several last years, as well as considerable reduction of its personnel. In Boeing's opinion, these losses have been caused by subsidies to Airbus. However, Airbus can object for its part that Boeing is to blame itself, since it does not observe schedules of orders execution and is not capable of developing an airplane needed by the modern market: so there is no Airbus's fault.

What is a procedure of decision-making in the WTO?

People who are hired by the WTO to settle trade disputes and make decisions on them usually work in other places, being engaged in the WTO on a temporary basis. More often than not, these people are not

experts in those areas in which they make decisions. At the same time the case on subsidies for Airbus and Boeing is the most important during the whole WTO history, putting the latter's capabilities to a serious test. It may happen that the two companies will agree to come to a compromise before the WTO decides.

Will this conflict affect relations between the US and EU?

The dispute over subsidies strains trade relations between Europe and the USA. As the WTO is now conducting a new round of international trade negotiations, it wants cooperation of many countries, including the EU and US. The latter, however, is inclined to think that the dispute cannot be solved by the two sides, so some outside agency, namely the WTO, must take the decision.

Natalya PORTYAKOVA,
Kommersant

FRENCH COMMITMENT

Snecma and Thales put hopes into a new Sukhoi design

Of the participants in the Sukhoi-led international industrial group working on a new family of small-capacity commercial jets, the French companies Safran and Snecma seem to be the most dedicated partners, the most willing to see the Russian Regional Jet (RRJ) flying off the ground.

Paris'05 provides a convenient platform for the RRJ international partners to forge their relations. They will do it by means of signing contracts on development and supply of major systems for four operable RRJ prototypes, two ground test airframes and up to sixty production examples. On the eve of Paris'05 we met Francois Quentin, senior vice president with Thales Aerospace division and Jean Pierre Cojan, head of Snecma commercial engines division, to find out how they see the role of their companies in the Sukhoi-led project that often receives controversial reports in the international media.

The French aspirations over the RRJ prospects are based on their vision of the emerging market for small commercial jets. This term is used to refer to the new generation of 100-seat passenger jets. These are meant to be something special. They are described as no longer regional, but mainline airliners with same level of systems as on the "real" mainline aircraft Airbus A320 and Boeing 737. One of their main applications would be scheduled flights on thin and sometimes relatively long routes that are flown today by A319/320 with 80-100 passengers on board.

The market for small commercial jets with 100 seats is believed to be strong in the next twenty years. Today it is almost inexistent. It is believed that, as time goes, and the "narrowbody" (six-abreast seating) mainline airliners will become larger. Future would-be successors to Boeing 737 and Airbus A320 family aircraft may have somewhat larger capacity. Their baseline models are likely to be 175 seaters. Logically, their shortened variants would be 125-150 seaters, and stretched 200-215 seaters. This would naturally create a need for "small commercial jets" with 90 to 110 seats that would supplement the narrowbody fleets from the bottom.

Snecma has done its own forecast for international air transport industry development. It is based on assumption of 5% annual rise in passenger numbers. The international airliner fleet is expected to rise from 15,080 units in 2003 to 32,570 in 2023. The forecast predicts deliveries

Avionics suite for the Sukhoi-led Russian Regional Jet (RRJ) is "repackaged technology" from the Airbus A380 depicted here in Toulouse Blagnac airport in between test flights (top)

of some 25 thousand new aircraft, including eight thousand as replacements to older designs. Of those regional jets will account for 21% and narrowbodies 45.5%.

The narrowbody fleet in the 100-seat segment is predicted to rise from 700 units to 820, 125-seat from 2,856 to 4,128, 150-seat from 2,554 to 5,895, 175-seat from 1,242 to 3,434 and 210-seat from 222 to 1,743. In the regional jet segment the 50-seaters will grow in numbers from 1,541 to 2,919, 70-seaters from 471 to 2,014 and 100-seaters from 292 to 1,469. In terms of deliveries the 50-seaters will generate 1,831, 70-seaters 1,849 and 100-seaters 1,311. Deliveries in the narrowbody fleet will be: in the the 100-seat class 616, 125-seat 2,852, 150-seat 4,165, 175-seat 2,720, and 210-seat 1,289. If that forecast proves right, the international air transport system should welcome advent of the small commercial jet with its family members configured for 70 to 110 passengers.

"We are going to be a new player in the market for small commercial jet aircraft", Cojan says. In 1999 the firm launched development of the DEM21 experimental gas-generator to assess new technologies that would be required for the given application. In 2001 Snecma teamed up with NPO Saturn to jointly bid in the tender for powerplant of the Sukhoi-led RRJ. They proposed the SaM146 turbofan engine (based on DEM21) and won the competition. In April 2002 the gas-generator commenced bench runs. "Before anything else, a new engine is HP compressor", Cojan states. Now, with DEM21 having performed to expectations in two series of ground tests, there is little doubt about technical performance of the entire engine.

The SaM-146 is optimized for 95-100 seater aircraft. It fares well in the 75 seater sector, but too small for the Bombardier C-series (110 and 130 seat aircraft). Competition comes from General Electric CF34-8 (70-80 seaters) and CF34-10 (80-110 seaters). The SaM-146 is close to the rival on specific fuel consumption (SFC). It should require less maintenance since it is a 14-stage design (the rival is a 18-stage one). "We chose to optimize it not for fuel burn, but for maintenance", Cojan says. In September 2005 Snecma starts tests of SaM146 core engine (no longer DEM21) as it targets SaM146 certification in March 2007.

SaM146 derivatives have thrust settings between 14K to 17,5K lb. Would-be growth version have to keep below the 18.5K lb, the border line set by the Snecma - General Electric agreement on the CFM56. Cojan says that "almost all" of the existing engines in that thrust range are derivatives of the basic designs that appeared in 1970s-1990s. Thus they are not optimal for the new generation of 100-seat passenger jets. The SaM146 is "not specific to the RRJ", Cojan continues, "but we are going to focus on the RRJ, because we already have partnership with Sukhoi... There are no other short term applications anyway".

These pictures give some clue which direction does the progress go. From operational Dash8Q400 to experimental Antonov An-148-100B and then over to future aircraft.

Cockpit of the Bombardier Dash 8 Q-400.

Cockpit of the Antonov An-148-100B (Aviapribor-Holding and Collins items).

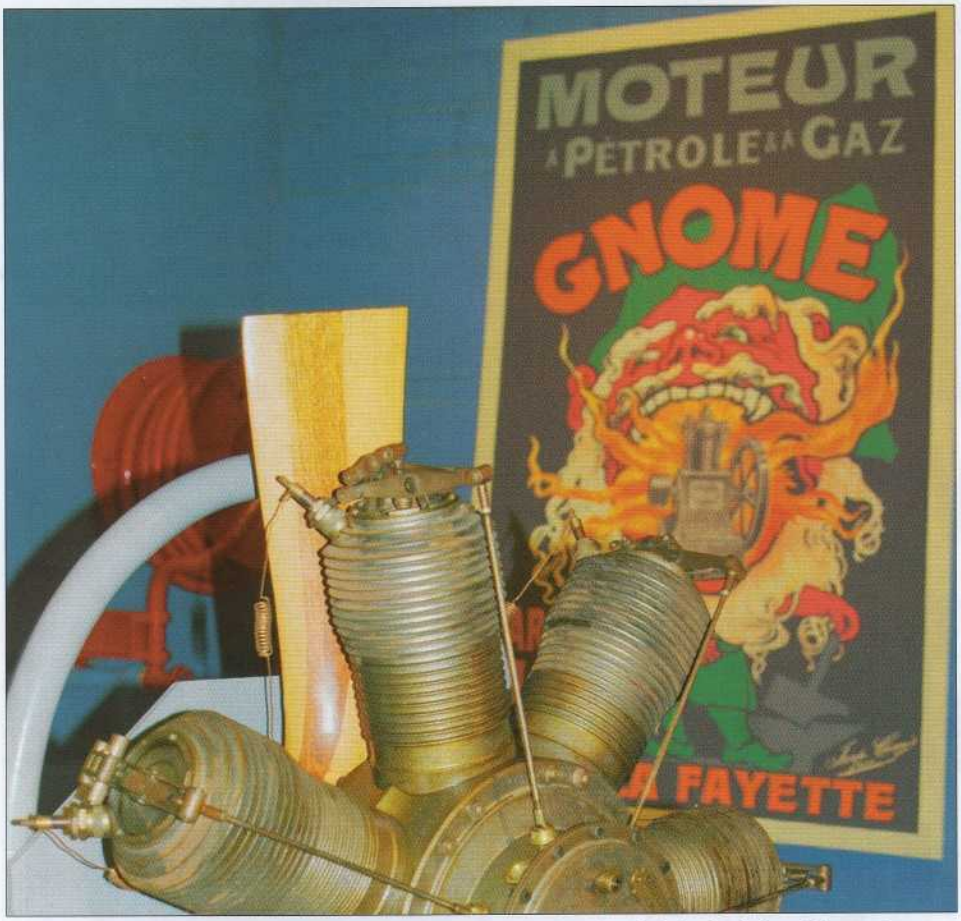
TopDeck 2005 - Avionics Suite for future business and regional aircraft.

The Antonov An-148 may have a SaM146-powered version, but Snecma is not much interested in it. The manufacturer does not expect the new Antonov jet to have sales in excess of 200-300 units (admittedly, Antonov forecasts at least 490 sales, half of that in CIS). "We would not have launched the SaM146 for the An-148", Cojan says. NPO Saturn estimates the break-even point for the SaM146 project in the region of 400 copies. The An-148 alone could not take that many, since its production would be split between the ZMKB Progress D-436-148 on the basic version and a would-be SaM146 derivative.

Antonov is respected in the business, Cojan says. There is little doubt that the aircraft will achieve type certification as planned in 2006, some two to three years ahead of the RRJ. And that it will offer similar flight performance and operational economics. Unlike the An-148, however, the RRJ is from the start is aimed at the international market rather than CIS. Sukhoi's international suppliers are meant to help the Russian company find ways to European and North American airlines. Even though the An-148 has a catalogue prices of $18-20million against RRJ's 23-$25million, Antonov may have more difficulties in rising funds for setting up mass production and maintenance centers around the globe to support would-be delivered airplanes. Cojan expects the RRJ to outsell An-148 on the international market as 9-10 to one.

Thales managers have broadly similar vision. Quentin says that while Russian and CIS carriers may see the An-148 as a direct competitor to the RRJ, it will not be so outside of the former Soviet Union. "The An-148 was probably much less designed having in mind "out of CIS" market. This gives the competiting edge to Sukhoi". The RRJ avionics suite was shaped by the RRJ airline council that attracted Air France, KLM, SN Brussels, SAS and NorthWest.

"A lot of work was done during 2003 and 2004 on airframe, engine and systems definition. Snecma and Thales have participated in a number of workshops about definition. We changed the definition of the avionics suite because of the focus group set up by Sukhoi on avionics had a number of European and US airlines. They provided Sukhoi with a strong feedback from the market." In early 2004 the airline council talked Sukhoi into a radical change of the earlier aircraft design. "The aircraft is now different to what they had had intention to do. It was a big message sent by the customers. And it was very smart of Sukhoi to have taken it into account". Quentin doubts Antonov went the right way since it did not have western airlines among advisers.



French Gnome&Rhone rotor piston engines powered some Russian aircraft in the beginning of the past century. Snecma's SaM146 will power some in the beginning of the new one.

Quentin says: "Sukhoi is probably building something extremely successful in the future, not only addressing the Russian and CIS markets, but beyond that. There are some airlines in Europe and US very interested in it. Now we have to deliver, and this is a second part of the story".

When the RRJ was being conceived, Thales already had strong partnership with Sukhoi on military programs, such as the Su-30MK series of multirole fighters. Co-operative projects began in early 1990s and led to sales in India, Malaysia and other countries. "It is a long story and we believe it is just a beginning of the story, even if it is already ten years long today. Until now the cooperation was based on military programs. The regional jet is a clear change of policy. We are very much interested in continuing our cooperation with Sukhoi beyond military platforms."

Quentin says that this change comes at a time when the regional aircraft are changing. "This aircraft is not the last in the line of airplanes built in the past twenty years. It is the first one of a new generation which are no longer regional aircraft, but, low-capacity aircraft for the air transport industry."

Embraer and Bombardier designs that dominate this market today have gone through a long chain of evolution. They started from 40-50 mainline versions that were then plugged. The stretched variants thus seated 70 and then 90 passengers, while essentially remaining "regional jets" with narrow cabins (four-abreast seating) and relatively simple systems. The RRJ represents a new generation that Quentin describes as "very consistent in terms of technology and product definition with the bigger aircraft like the A320 and 737." Thales is offering its cockpit solution to this new generation. "It is an air transport grade, not an equivalent of regional aircraft avionics suite existing on the marketplace today".

Quentin says that the airlines provided valuable information on what the next-generation aircraft and its systems should be. "Air France upgraded the cockpit to a 100-seater with some gross capacity. It was a big change." The 45-tonne RRJ-95LR with the cabin housing from 95 to 105 passengers replaced the smaller 37-tonne RRJ-75 in the role of the baseline model for the whole RRJ family.

From its previous experience with Sukhoi, Quentin has no concern about the Russian company's ability to make the RRJ a good-flying airplane. "Sukhoi is Sukhoi, they know how to create good airplanes. The image and reputation of Sukhoi will probably give the same momentum to this program as Dassault had given to the Falcon family. Very good, very reliable, extremely efficient high-end airplanes. The success factor which provided Dassault with competitive edge over the competition, will be applied to Sukhoi as well. Same reason and same consequences".

While the RRJ project may well create a new outlet for Sukhoi, Snecma and Thales, it will not give much work to Russian avionics and systems suppliers. Sukhoi seems to have dropped its early requirement to its western partners on what at least 50% of their systems should be made in

Russia. Quentin says, "We are working with Sukhoi directly. And it is probably another good reason to reinforce our partnership. A significant amount of the software is responsibility of Sukhoi. They have extremely good capability in-house. This decision was made by Sukhoi. We have no objection to that. All of us have responsibilities and a common objective to deliver a good airplane on time to the market. Opening it to a third party would probably have increased the risks."

Non-involvement of Russian avionics specialists may create difficulties with Russian certification, since neither Sukhoi nor Thales have previously had airliner certification experience in CIS. Quentin admits differences in Russian and western certification principles and methodology. "However, there are some talks between the Russian body and European body to align principles. We will talk to both bodies in parallel well in advance to make sure they understand what we are doing". EASA was set up last year. Hence RRJ certification will be a new experience for European certification authorities "They have an objective to cooperate with their counterpart in Russia. The regional jet is a very good example for that."

Sometimes the RRJ avionics suite is described as "simplified A380's". Quentin comments: "It is rather derived than simplified. You might have said "simplified" because cockpit is much smaller. But you can not say "simplified" because it is also a commercial transport grade rather than a regional grade." To fit into smaller volumes (and also in view of some legal considerations) the A380 avionics will undergo "repackaging" on its way to the RRJ. "It is not a copy but rather an adapted version. In some respect we have been farther in terms of technology development. The RRJ avionics set was integrated three-four years after A380 definition. So it has also drawn some experience we gathered on the A400M."

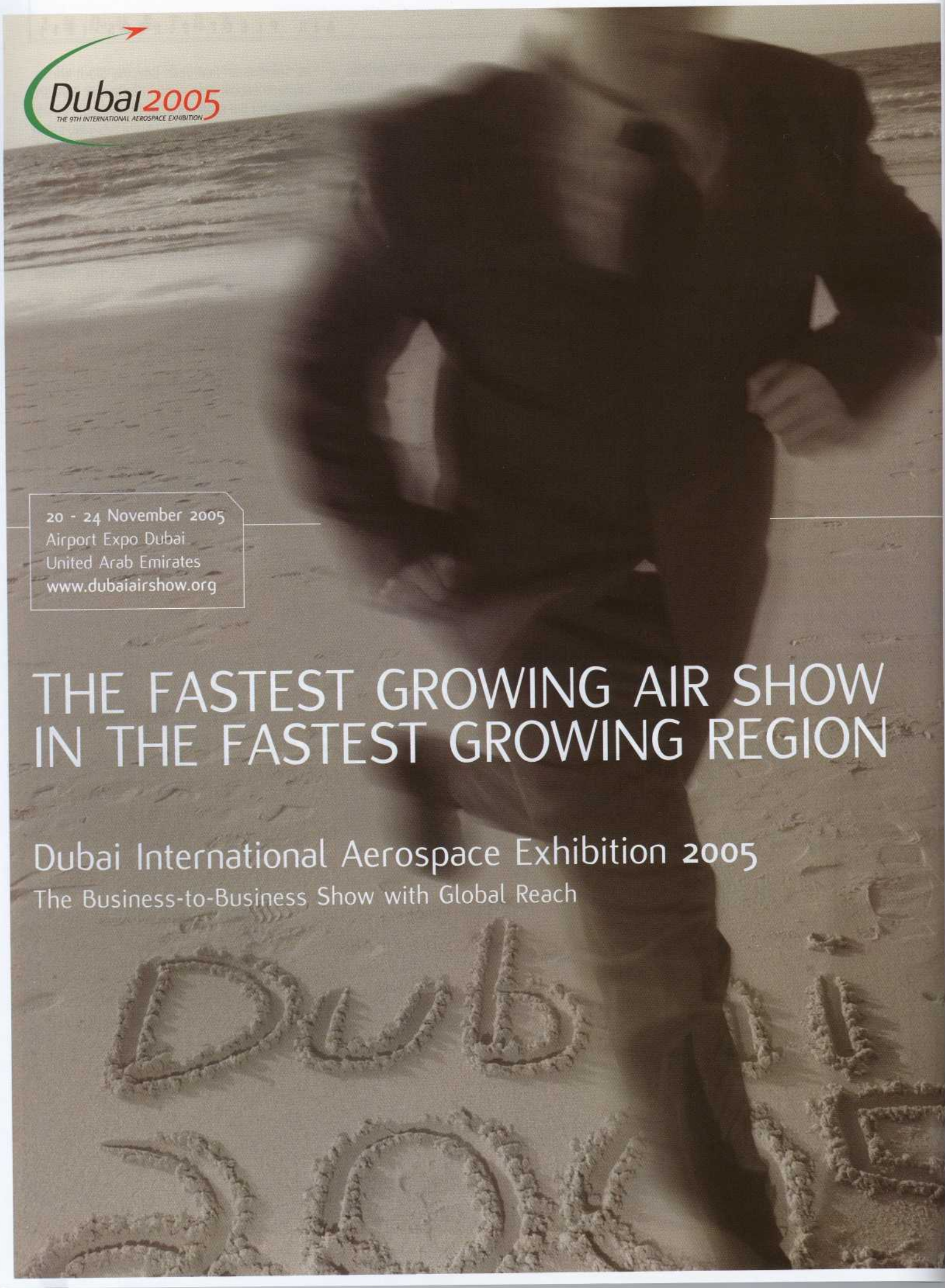
In terms of part number the commonality between A380 and RRJ is "very limited, if nonexistent". Quentin says: "We do not re-use boxes, we use subfunctions and sub assemblies." Thales does not use anything "owning or belonging" to Airbus, Boeing or Bombardier. "What Airbus designed for the A380, Thales can do it itself on the RRJ." Besides, Thales has wider responsibilities on the RRJ (where it acts as "avionics integrator") that it has on Airbus aircraft.

There is an import point that needs special attention. The RRJ has a status of co-operative interstate project between Russia and France. This makes it different from the An-148 that does not have it. Such a status helps French companies in receiving state aids for their RRJ work. For such projects the government of France provides funding on favorable (yet refundable) terms. "We have submitted a request to have access to this program. It is being process. We are confident that this project has a priority at the governmental level", Quentin says. Thales made its submission last year. Snecma did it earlier, because engine development is longer. "We are waiting for the requests to be processed. I do not know whether it would take place this year, but in any case it does not matter if it is next year", Quentin says.

For the RRJ project to succeed the current Russian customs procedures shall be changed. RRJ's western content will be at least 50%. Paying the standard import tax of 20% with 18% VAT on top of that may render the whole thing not commercially viable. The French companies believe this issue will be resolved before the project goes into an active phase. Sukhoi has been trying to receive a special favorable regime for the whole of RRJ program, including tax-free spares deliveries to airline customers. The company hopes to achieve it by the end of this year.

"I am not specific about any action from the Russian government. What is needed is some positive attitude to non-Russian aerospace companies setting up operations in Russia", Quentin says. This means that the Russian government has to make a move and align its practices with the rest of the world. That's perhaps the most important condition for the RRJ and other co-operative international projects with large Russian participation to succeed.

Vladimir KARNOZOV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TOMORROW'S BLUEBIRD?

If we look at the most confused issue of Russian civil aviation, that of production of passenger airplanes, we must pay special attention to the latest project – Russian Regional Jet (RRJ). Many think it to be Russia's hope for the civil aircraft industry revival. Yet any unprejudiced observer can notice that the programme does not fare well.

Let us consider its price. The first publicly quoted unit price of $14-16 mln was patent "politics". It had nothing to do with calculations of the realistic project price but rather with the rough reality of the contemporary Russian market where more expensive aircraft could hardly have been demanded. It was equally impossible to postpone announcement of the increased price until delivery date – even in Russia such conduct is considered unacceptable. That is why last summer at Farnborough Air Show Mihkhail Pogosyan revealed that one RRJ would cost $25-26 mln. The price corresponds to that of the Embraer ER-190 aircraft competing with the RRJ in a bid announced by Aeroflot. Let us remember that the Brazilian aircraft is expected to achieve certification shortly, while the RRJ exists only on paper.

It can be said a propos this tender that a long and slow process of Aeroflot procuring a batch of six Il-96-300 aircraft has at last got off its standstill. Some suggest that Vladimir Ivanov from President's Administration, who was appointed a head of the Aeroflot's Board of directors, should be thanked for the advance. With a liberal share of confidence this turn of situation can also be related to the RRJ programme: in gratitude for its commitment to procure indigenous (though imperfect) airliner, the company may be rewarded with permission to buy Brazilian regional jets.

Another attempt by Sukhoi management to support the RRJ programme was made last June when Mikhail Pogosyan signed an agreement with the leadership of Novosibirsk Region. In accordance with this document Pogosyan promised to help Novosibirsk Aviation Production Association (Russian abbreviation - NAPO) out of crises by ensuring influx of investments into the region and improving its social climate. The regional administration must ensure signing of the procurement contract for 50 RRJs by Sibir airline. Indeed last July, at the same Farnborough, Sukhoi and Sibir concluded an agreement, loudly trumpeted about, on delivery of 50 RRJ aircraft. Yet the two signatories did not comment on contract's details at that time, nor do they today. It might have been just a preliminary agreement with no binding obligations.

After that the leadership of Sukhoi Aircraft Holding Company announced contracts allegedly concluded with a major air carrier UtAir (20 aircraft), and Pochta Rossii Company (7 aircraft). Neither contract was commented.

Aviation pros can find associations with the destiny of the other Russian regional airliner – the Tu-334. At MAKS 2003 exhibition loud declarations also were made about a number of purchasers of the widely advertised Project 334, mentioning the famous Russian air carrier Pulkovo. Alas, the Tu-334 production has never been launched (despite the fact that it has been flying for a long time now, unlike the RRJ) and there are still no procurement contracts signed.

But let us come back to the agreement between Sukhoi and the Novosibirsk Region administration. It seems highly improbable that the regional authorities will be able to ensure contract's implementation by applying the administrative pressure. Sibir airline is strong enough economically to actively lobby its interests. The more so, as its main technical and operational base has moved from Novosibirsk to the Moscow Region after its uptake of Vnukovo Airlines company. In reality it means that the Novosibirsk bureaucrats have rather narrow possibilities to exert pressure on the airline, only formally related now to the Siberian region.

Another means discussed at the time of signing the agreement by Sukhoi and Novosibirsk Region, concerned financial support to the project provided by the regional administration. It is feasible in theory that the Region in the person of its leader and deputies to the State Duma and Federal Assembly will succeed in lobbying the provision of a state loan guarantee. Such credit facilities could be found abroad, not in Russia, with an acceptable (for Sibir) interest

The RRJ is a beloved project of Mikhail Pogosyan

rate. Whether the state would wish to grant such guarantee remains to be seen.

There is also an option to include Sibir's procurement of the RRJs into the aircraft leasing state support programme. Such precedent exists: it was exactly how Dalavia airline signed a leasing contract on two Tu-214 airplanes.

But the this year's budget has allocated to airplane leasing only 6 bn roubles (about $215 mln), practically all of which have been already assigned to concrete programmes. Whereas the contract on 50 RRJs is estimated by various sources to be from $750 to $1 bn.

It would be precarious to presume that NAPO could recover by manufacturing the RRJ aircraft, either independently or in cooperation with other plants. It seems an extremely difficult task to organise in Novosibirsk production of this aircraft from scratch. The plant has been out of production for a long period of time. It has produced separate An-38 light transport aircraft. Only two aircraft of the type are now in operation in Vietnam, and it would have been premature to speak of its wide-scale sales and production prospects. The other NAPO's product is the Su-34 fighter-bombers also built in single numbers, since the Russian Air Force has had no funds for many years to procure them in spite of all their superior characteristics. These days the plant's main source of revenue is upgrading of the Su-24 aircraft previously produced there, on contracts with foreign air forces.

The total of investments required for the revival of the Novosibirsk plant would make the RRJ unaffordable for Russian air carriers. Apart from this, the problem of recruiting skilled labour will be difficult to solve. Hundreds of qualified foremen and specialists of all levels and professions have left the plant during many years of a muted production. Bringing them back would be as hard a task as training new specialists: the latter would involve much more time and money.

If in Novosibirsk Mikhail Pogosyan has named NAPO as the main candidate for the RRJ manufacture, in Komsomolsk-on-Amur Aviation Production Association (Russian abbreviation – KnAAPO) people are certain that the new regional jet will be manufactured at their plant. Yet the plan for producing the RRJs at KnAAPO is charged with traps. Having all necessary specialists and technologies, the plant may face serious working space problems with assembling relatively large passenger airplanes in the fighter-manufacturing plant. A need may arise to radically restructure and expand the assembly shop, which will be a complex and expensive task for the plant with its densely built areas. It will add up to the prime cost of the RRJ aircraft. Nevertheless, Sukhoi leaders announced that KnAAPO has already begun manufacturing fuselage elements with the long-term production cycle.

Let us not overlook deadlines when we speak of the RRJ production. Sukhoi leaders have indicated 2007 for the aircraft certification, its series production and deliveries start. Since aircraft certification takes at least one year, the

The Embraer airplanes proved their operational capabilities in cold climate typical of Russia

Boeing's Role in the RRJ Programme

At first glance Boeing's participation in the RRJ programme looks like a pure philanthropy. Although experts (and not only Russian) can hardly believe it. Guy Norris, observer of the oldest aerospace magazine Flight International, asks if Boeing acts as a consultant only, or whether it may view this cooperation as a backdoor to the regional jets market and a means for fast modelling its own regional airliner programme in future.

Here comes the next question: why should Boeing want data on the aircraft outside the class of aircraft it manufactures? Late last year it rejected a proposal by Canadian Bombardier to cooperate in the latter's CSeries programme. Even earlier it had stopped works on the regional aircraft project 717-100X. It seems that Boeing is compelled to study business opportunities in other market segments being challenged by Airbus ever growing stronger. Alan Mulally, president of Boeing Commercial Aircraft division, spoke about long-term programmes for aircraft with up to 90-seat capacity. It is far less expensive to launch a trial balloon with the help of Russian engineers and economists than to start joint project with Canadians. The truth is that Boeing invests no real money in the RRJ programme.

In general, American involvement in the joint project is worth of noting. The agreement on cooperation puts forth the assessment of general capability for joint design, manufacturing, certification, marketing, sales and maintenance of the new regional airliner in the international market. It foresees preparation of a preliminary business plan that should make a basis for assessment of a possible joint aircraft development programme. So, Boeing did not reject idea of its full-scale participation in the aircraft development programme.

But the collaboration has transformed gradually in the course of time into purely technical consultations. Actually Boeing hands over to its Russian partner standard design and engineering solutions worked out in earlier projects (with an ulterior motive of gaining profit as we shall see below). Well, Boeing should be thanked for that, since Sukhoi has no experience in designing passenger airplanes, and the transmitted information prevents errors saving time and money. The Americans will get instead a clear concept of the regional aircraft with results of authentic calculations, wind tunnel tests, simulations and economic analyses.

It brings to memory one previous Sukhoi's experience in cooperating with a US aircraft company. Some 15 years ago all Russian-language aviation and nation-wide publications extolled to the sky bright prospects of a joint US-Russian supersonic administrative aircraft project. The then Sukhoi's partner was a very famous US company - Gulfstream, the world-renowned producer of business-class jets. Sukhoi Design Bureau did a great amount of work that would have cost Gulfstream pretty sums of money in the USA or Europe. Russians were paid symbolically by world standards. And after the Russian part of work had been ended the US company announced that the production of such aircraft would be premature and retired from the stage with rolls of drawings and calculations under the arm. Today discussions on a supersonic administrative aircraft are renewed in the USA but nobody invites Sukhoi back: why, if all required materials have been long secured.

Eventual benefits for Boeing in the RRJ programme are not at all exhausted with the above. Some Westerners suspect that the US takes part

first RRJ prototype production must be completed in 2006. It means that at present the plant must be assembling major airframe parts, such as fuselage, wing, empennage, but the production has not yet reached that phase. It can be affirmed with confidence that 2007 will see neither the RRJ aircraft certificated nor its deliveries started.

Sukhoi managed to persuade foreigners, strange to our national custom of giving unsubstantiated promises, of the RRJ programme's viability. It is pitiful that they have persuaded wrong foreigners rather than those who should have been persuaded: Brazilians. The point is that the non-existent RRJ might have become a real block on the road to the real contract on delivery of the Su-35s to Brazil. One of the reasons why this contract could not meet full approval in Brazil was fear that the money paid for the fighters would be invested by Sukhoi in its RRJ programme. Brazilians were naturally opposed to financing with their money the development and manufacturing of the aircraft seen as a direct rival to the Embraer products. Brazilian ambassador to Russia Carlos Augusto Rego Santos-Neves spoke about this openly during his trip to KnAAPO.

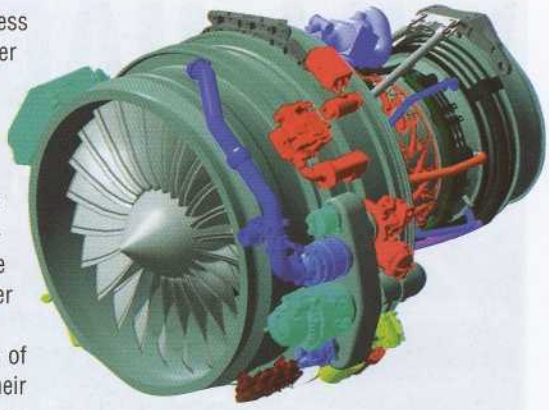
Meanwhile Russian authorities are ambiguous in this case. Their providing a $100-mln credit state guarantee for the RRJ programme is an eloquent evidence of the fact that nobody is about to give up principles.

Brazil has now postponed bidding for fighters. But a new evidence of Russian ambivalence concerning the RRJ programme is manifest. There are reports that Aeroflot has nonetheless obtained permission to procure the Embraer regional jets. The deal is expected to get official approval at high level during the visit to Brazil of Russian Prime Minister Mikhail Fradkov. It is again the same old story: Russian authorities support the RRJ aircraft with the one hand, by guaranteeing a multi-million credit, and destroy the slightest hope for its delivery to the largest national carrier with the other hand.

Let us review arguments that supporters of the RRJ programme are putting forward. Their main argument is about mighty foreign partners. The statement that "the aircraft is developed with The Boeing Company itself" sounds in their mouths as a warranty of imminent success. Reasons for Boeing's participation in the RRJ programme and its nuances are so intriguing that they deserve a more detailed analysis (see the insertion).

The latest argument of the RRJ supporters is French entering the game. Snecma announced that it would develop an engine for the RRJ in cooperation with the engine builders from Rybinsk. The French government promised to allocate _240 mln to this project.

But what does it really mean? It means only that the French government allocates money to another French company, simultaneously providing a partial security against accusations from overseas of subsidizing its aerospace industry. Some part of this money may come to Russia and be used together with Russian budget funds assigned to the RRJ programme. And



The SM146 will be manufactured by Snecma in cooperation with the engine-builders from Rybinsk

Snecma will get high-quality developmental work done by modestly paid Russian engineers. It would be interesting to know whether the contract stipulates that the French company has no right to offer these engines later to third parties (to Brazilian Embraer or Canadian Bombardier). The market of regional aircraft where Americans play the leading role is very much attractive to French engine manufacturers.

So what is the RRJ programme today? On the one hand, it combines vague prospects for its price and sales with problems of organizing its production. On the other hand, it has solid foreign partners who in fact mind their own businesses. Is it enough for the RRJ to become a blue bird of the Russian civil aircraft industry?

Alexey PETROV

Designers of the RRJ aircraft finally made their minds to follow Europeans and dropped the idea of the pilot's cabin proposed by the Boeing Company

in the project to facilitate promotion of their products to the Russian market. Experts point out that key Boeing marketing strategy consists in making some components of the RRJ similar or even analogous to those of the 737. Boeing marketers believe that such solution would facilitate transition of flight and ground personnel from the RRJ to other types of company's aircraft. Thanks to reduced expenses for personnel retraining leaders of Russian airlines would get additional justification for procuring Boeing airplanes up to 777 model. Thus, resourceful Boeing Odysseys prepared the RRJ for the role of a Trojan horse in the post-Soviet market.

Some of these plans would not be realised to a full extent. For example, successes of the European aircraft builders encouraged the RRJ designers to introduce side control sticks into its pilot cabin, breaking down US hopes for simple transition of RRJ's pilots to Boeing airliners. But other potential benefits remain. Bill Jarrell, Boeing Commercial Airplanes program director for the RRJ, is still confident that his company will be able to derive profit from this project.

Another Boeing's motive could be its desire to expand presence in the Russian market by getting economic preferences. Boeing may want to obtain certain preferences for its products, concerning import duties perceived in the West as prohibitive. This could be achieved by using close relations established by Boeing with various Russian aerospace organisations during its participation in the RRJ programme, although similar attempts done before attained no particular success.

It is plain that Boeing studies its own interests when participating in the RRJ programme, and too often these interests are not connected closely enough with the success of the programme itself. The Americans are not yet satisfied with its results. Nevertheless potential advantages that still remain are substantial for Boeing to continue its cooperation with Sukhoi.

Those, who are still sure that the RRJ programme is doomed to success because of the Boeing support, should listen to Bill Jarrell's warning against "wrong perception" of Boeing's role in the RRJ programme. They should pay heed to this caution. And finally, is it entirely out of place to reflect why Boeing should grow anxious that its role in the RRJ programme is considered more active than it is in fact?

WILL UAC SAVE RUSSIA'S AIRCRAFT-BUILDING INDUSTRY?

Taking floor at the meeting of the State Council of the Russian Federation, Russian President Vladimir Putin declared that consolidation of the domestic aviation industry should be finished in two years. So much time is given for establishment of the United Aircraft Company (UAC). What will the unification bring to the Russian aviation community?

Since there is no official document concerning the UAC issued so far, we have had to peruse the Draft Project on Establishment of United Aircraft Company prepared by the Ministry of Industry and Power Engineering of the Russian Federation and published last October.

It must be stressed that consolidation concerns only aircraft design bureaus and serial plants. Aircraft builders themselves oppose consolidation of developers and manufacturers of aero-engines, avionics and aircraft equipment (the whys - see below). The Concept leaves out helicopter designers and manufacturers – their consolidation is underway under control of Rosoboronexport. It is still unclear to what degree the United Helicopter Company will rely on the United Aircraft Company. In many respects this will depend on whether Rosoboronexport will be willing enough and able to retain its control over its creation.

CONCEPTUAL PROVISIONS

The final (official) concept of the UAC is not yet published. Its first version appeared already last autumn. It makes no sense to cite its paragraphs reviewing the Russian aviation industry – they depict deplorable situation in it. Yet some recipes proposed for curing its crises are of interest.

Russian aircraft industry, in cooperation with its strategic partners, including those in South Eastern and Central Asia, must position itself in the global aviation market as the third major centre along with the USA and Western Europe.

The latest developments indicate, alas, that this is hardly feasible. The main partner here - India did not express its desire to take part in the 5th generation fighter programme, nor in the RRJ programme. And the MTA transport aircraft joint programme is definitely too small-scaled to live up to such ambitions.

Institutes of branch and fundamental science must participate in implementation of advanced research on the UAC's long-term

projects getting full-scale financing for it, while making no part of the UAC.

Bureaucrats, industrialists and scientists insist that science can exist only if aided by state. Withdrawal of aviation research centers from the UAC structure will preserve existing financial crisis in them.

Preferential orientation to the limited inner market that is becoming de facto a part of the world market is erroneous.

The Russian inner aviation market has not become a part of the world market until now and hardly will become such in the near future. Aircraft import prohibitive import duties are barring way to Russia.

Returning to the world market will be ensured only by a "breakthrough" idea.

This article of the Concept provoked a good number of critical arrows and even gibes in the aviation community. Nobody can fancy what the breakthrough idea can be. Neither is clear what authors of the Concept mean in this case.

Russian market must be reserved for indigenous aircraft. National competitiveness can be maintained only with state's support.

The Concept confirms the necessity to maintain the most severe protectionist measures to keep the Russian aircraft market isolated.

Participation of one of the four global aircraft manufacturers (Boeing, Airbus, Bombardier, Embraer) as a major airframe part developer and supplier in a major project on a partner risk-sharing basis

Russian specialists cooperate with both Boeing and Airbus: they are not equal partnerships. Embraer has grown cool to the idea of partnering with Russian companies after its CEO Mauricio Botelho visited Russia, and Bombardier has virtually no contacts with Russian aircraft builders.

Many factors increase risks to plans to enter the 5th generation fighter (advanced front-line aircraft) into the world market in the shortest time. In such circumstances it is advisable to follow example of the Western Europe by concentrating efforts on major systems development for the advanced aircraft (radar, engine, smart weapons, avionics, etc.), while preparing concurrently the airborne platform defining its concept on results of the advanced systems development.

This clause means literally cancellation of a full-scale development of the 5th generation fighter. The reference to the West European experience seems out of place since West European aircraft companies never announced the development of the aircraft that could be called "the 5th generation fighter".

Russian President Vladimir Putin keeps aviation in sight

The UAC's strategic goal is to take 10% share of the world aircraft market with the production and revenue volume growth rate increased by 2 - 2.5 times.

It should be remembered that military sales of the Su-27 family fighter, the main export commodity, are falling down. Last year Russia produced only 17 civil aircraft. In such circumstances the target of winning 10% of the world market looks very Utopian.

MOODS IN THE INDUSTRY

It must be admitted that there is no clear unanimity within the aircraft industry as regards consolidation (unification). Corporate leaders fall into several related groups. Even if supporting the unification idea (sometimes - only in words) their representatives are motivated by different aspirations and intentions. Let us exclude right away those who are propelled exclusively by their personal careerist or narrow-minded corporate interests. Their position is simple: "all must unite, and the united structure must be headed by my company". They advocate seemingly sound reasons and arguments, but these do not alter their main hidden egoistic motives.

The first group includes enterprises with relatively stable financial situation (Sukhoi, Irkut). Unification for them is not very advantageous, generally speaking. After merging with insolvent companies these well-to-do companies will have to become donors.

The Irkut's structure is known to be founded on solid economic grounds. That is why all its divisions are being or will be loaded with enough work. RSK MiG (which is to be united with Irkut within a one-year's time according to the two companies' head Alexei Fyodorov) has a decent workload: ship-borne MiG-29Ks for India and

BRIEF HISTORY OF CONSOLIDATION

Time and again the Russian government made attempts to develop ideas of the aircraft industry integration. The very first proposals were made by the Ministry of Defence Industry as early as 1996, and expired with its demise. The consolidation idea was next picked up by the Ministry of Economics headed at that time by Yakov Urenson. Originally the enlargement concepts foresaw establishment of large holdings – Sukhoi, Mikoyan, Tupolev, Ilyushin, and so on. Afterwards two large companies were proposed: for military and civil aviation. That was the first attempt to eliminate competition from the Russian aircraft industry (which existed in some forms even in the USSR).

The Federal Target Programme for Reform of the Defence Industry Complex gave a new evolutionary turn to the aircraft industry consolidation idea. It was developed in the late 1990s in the time of Ilya Klebanov. The same two companies were proposed, but the principle of their formation was different. Each company should have developed and manufactured a full spectre of aircraft (combat, transport and passenger aircraft, as well as helicopters) and competed with one another.

The programmes of German Gref and Boris Olyoshin are the latest ones. The notion of the United Aircraft Company (Russian abbreviation – OAK) first appeared in their documents. The Draft Concept of the unification was prepared by the Ministry of Industry and Power Engineering at the end of November 2004.

MiG-29SMTs for export sales). In case that RSK MiG secures the contract on 126 fighters for the Indian Air Force, its economic situation will further improve.

Sukhoi Holding's main revenues have been secured by deliveries to China of the Su-30 MKK fighters manufactured by Komsomolsk-on-Amur Aviation Production Association (KnAAPO). The second serial plant included into the holding – Novosibirsk Aviation Production Association (NAPO) – is in fact a dead weight. Its main products are the Su-34 front-line bombers acquired by the Russian Air Force in negligible numbers. Given a minimal volume of the state order (about 5%) and a hiatus in 2005-2006 sales on export contracts, both KnAAPO and NAPO should switch over to production of civil aircraft, first of all – the RRJ, according to Sukhoi's leadership. But this programme, even if successful, can start bringing serious revenues but later. This is the reason why the holding can become one of the most ardent supporters of the unified company now that its economic situation is deteriorating. These aspirations will be fueled by Sukhoi's chances of heading the industry.

As was stated by some high-placed officials (and is dictated by harsh realities), the consolidation of the aviation industry must necessarily be preceded by its "purging". This is the term for conversion or, in grave cases, closure of the plants that cannot be provided with orders. The most probable candidates have already appeared. They are the aircraft-building plant in Saratov and, probably, RSK MiG's Production Centre named after P.A.Voronin in Moscow. RSK MiG owns a modern production facility in Lukhovitsy near Moscow, while the merger with Irkut would bring back Sokol Plant in Nizhni Novgorod, a familiar facility to MiGs. Sokol Plant is now manufacturing the Yak-30 combat trainers designed by Yakovlev Design Bureau (making part of Irkut Scientific Production Corporation). Thus, the Moscow-based Production Centre can be easily sacrificed, considering that money paid for it can be invested into other programmes.

Boris Alyoshin (in cockpit), the initiator of the UAC creation, comes from the aviation industry

Helicopter-building plants will not be integrated into the UAC

Idle serial plants at the UAC as a possible way out of their crises. Such enterprises, as VASO plant of Voronezh and Aviastar of Ulyanovsk, are ready to restore series production of their main products - Il-96 and Tu-204 family airliners respectively, after receiving financial injections.

CIVIL AIRCRAFT BUILDERS' STRATEGIES

Design bureaus, specialized in passenger and transport aviation, are now earning their living mainly by extending service lives of aircraft in operation. They expect of the unification fat state donations and no competition. One must remember that the Concept foresees formation of the subholdings – "Civil Aircraft" and "Military Transport and Utility Aircraft". It can be easily imagined that leading positions will be occupied by Tupolev in the first case, and Ilyushin in the second case. Both will be completely protected from competition with other Russian manufacturers: with, for example, Yakovlev (which is going together with Irkutsk into the Military Aircraft subholding), as well as with plants struggling to preserve their independence – that of Kazan, as another example. The state is also expected to provide protection to the consolidated companies from competition with Ukrainian aircraft builders.

However, the aircraft builders want to preserve competition at the subcontractor level. They think that in Russia there must be at least two engine-building companies, two avionics developing and producing companies, and independent manufacturers of aircraft equipment.

Their position is quite understandable: only with the second-level companies competing they will be able to select high-quality components and preclude monopolistic dictate in this area. Whereas they refuse such right to airlines which will have to buy, just like in Soviet era, aircraft offered by the manufacturers. The unification supporters from among aircraft developers prefer not to answer the question if this is not a manifestation of the double-standards policy.

Ideologists at various levels defend the idea of monostructure, stressing necessity to ensure competitiveness with Boeing and Airbus. Undoubtedly the aircraft builders will use all their lobbyist potential to limit access of foreign-origin aircraft to the Russian market, even if they intend to compete with their Western counterparts in the third world countries. Yet today it is very difficult to enter, for example, Chinese market which is conquered by Western aircraft companies.

The UAC can ensure a relatively peaceful life for our aircraft builders in the domestic market. With the time for massive phasing out of passenger and transport aircraft coming soon (some 80 An-12s are in operation now), Russian air carriers will have to procure only Russian-made aircraft. Not all of them are as influential as Aeroflot to lobby lease of foreign-made aircraft, while consolidated aircraft builders will have much more clout in preventing foreign aircraft imports.

AVIONICS MANUFACTURERS' WOES

The plan for the avionics manufacturers industry is not entirely clear. On the one hand, the Concept presumes that it should be consolidated into the Units and Components subholding. On the other hand, the aircraft builders oppose such consolidation. In any case the avionics developers and manufacturers are staying out of the consolidation process. In this respect the position of Avionika Concern, comprising not only electronics plants, seems rather dubious.

Avionics manufacturers will be seemingly pushed to sail in the stormy waters of competition. Besides they are afraid of monopolistic customers. They ask: even if avionics subcontractors are selected in a bidding process, what are the options for contenders who lost? Russian avionics manufacturers will have to compete not only among themselves but with their foreign counterparts. In such circumstances it is impossible to understand how Russian avionics, at least some branches of it, can survive.

Thus, the main problem with the Russian aviation industrial survival consists not only in preserving works in aircraft-building plants, as laymen may think. One idle aircraft-building plant is certainly a disaster, but we have sufficient quantity of them. More disquieting is the fact that, starting from the USSR era, production of some components was concentrated in just one or two plants. For example, electrohydraulic boosters, without which modern aircraft cannot be made, have been developed and manufactured by two enterprises only: Rodina Plant in Moscow and Voskhod Plant in Pavlovo-on-Oka. The Moscow-based enterprise is practically non-existent, and if something wrong happens to Voskhod, Russia will lose production of most important aircraft component. After several such losses, the country which is deemed to formally possess the aircraft industry will be able to only assembly airframes (to be equipped with foreign-made components). This situation will bring down drastically profits for the aircraft production, as cost of engines and equipment considerably surpasses that of the airframe. Moreover, the country's strategic security, i.e. its capability to independently manufacture combat aircraft, will suffer badly.

In contrast to the Soviet period Russian aviation plants produce more than one type of aircraft

The assembly shop in Lukhovitsy Plant (RSK MiG) was built for the Tu-334 production never started

LOOKING WESTWARD

Supporters of the radical consolidation of the Russian aircraft industry have one argument put

The treasury of the Russian aviation industry is its qualified personnel

DRAFT CONCEPT MARKED FOR REVISION

Early this May the Administration of the President of the Russian Federation passed negative resolution on the Draft Project on Establishment of United Aircraft Company (UAC). Minister of Economic Development German Gref also expressed his negative opinion on the subject. No official comment on reasons for disapproval was given. But according to unofficial information, the Administration was irritated by the fact that authors of the Concept gave preference to privately-owned companies in the UAC.

It can be presumed that it was Irkut that should have become the basis of the UAC, since the Draft Concept preparation was supervised by managers from Irkut. Since Irkut belongs mostly to private shareholders, this idea provoked discontent of the country's leadership.

As a result, the Draft Concept was sent for revision. No information is provided as regards the date for submitting the revised document to the government. Earlier it was believed that the Draft Concept would be approved by 25 April 2005.

in a chant: "Look, even Americans, partisans of competition, have come to the idea of a single aircraft-building company". One has only to look at the US civil aviation market, rather than the US aircraft industry, to realize how groundless it is. In the US market one can see two mainline aircraft manufacturers competing – Boeing and Airbus. And the US government does not set import barriers, nor appeals to the patriotism of the domestic airlines – they are free to procure both indigenous and foreign-made aircraft.

It makes no doubts that the Russian market must not fully open to foreign-made aircraft – our industry is not prepared to endure an open competition. Besides, entrants to the World Trade Organization are allowed to practice restriction import duties for some period. But to preserve competition between Russian air systems is of truly paramount importance. Otherwise we will face the same situation as with Russian car-manufacturing.

The Americans have made no consolidation of military aviation. Their aircraft programmes have clashed in harsh competition, mostly between Lockheed Martin and Boeing. There are no alternative sources for acquiring efficient air materiel, other than indigenous, and they seem resolved not to let in European competitors. The UAC Concept has even outdone the US system – our military aircraft manufacturers will have to be consolidated.

PROSPECTS AND POSSIBILITIES

One must not see consolidation of the Russian aircraft industry as all minuses and problems. In the present economic situation consolidation may be the only chance for survival. Certainly, consolidation of state resources could have been done without consolidation of plants. But bureaucrats prefer one organisation for channelling funds there – in that case the responsibility for the expediency of expenditures is transferred to aircraft builders.

The Yak-130 combat trainer is one of the Russian new-generation aircraft in production now

Successful outcome of this process will depend on what organisation and personalities will lead consolidation and, ultimately, the UAC. If it is done improperly, Russia will, of course, retain its aviation industry, but at the level similar to that of Spain and Italy. Their consolidated companies: CASA in Spain, Aeromacchi in Italy, are unable to independently solve serious tasks of equipping their national air forces and air carriers.

Undoubtedly, Russia cannot be satisfied with the present situation. To remain the world's leading aircraft manufacturer, it should solve two main problems during its aircraft industry consolidation. First, capacities for development and manufacture of all important components and systems, necessary for equipping modern aircraft, should be retained intact. Second and more important: existing design schools should be also retained too and their competition provided, at least at early phases of aircraft development. If not, Russia will have to forget about its status of great air power, may be for ever.

Alexey ZAKHAROV

The UAC organisation may hamper the Ukrainian An-140 production at Samara Plant

Tu-204-300 Achieves Certification

The base variant allows for a three-cabin economy class passenger compartment with 157 or 155 seats. Other variants are also provided, particularly a combined one designed for carrying 142 passengers, of which eight – in business class and 132 – in economic class. Business class seats are equipped with individual information-and-entertainment complexes allowing seeing films and airline news materials

On May 14, 2005, an event that had long been expected by Russia's aviation community took place. Chairperson of the Interstate aviation committee Tatiana Anodina presented Igor Shevchuk, Tupolev JSC's CEO, with an outboard noise type certificate for the Tu-204-300 medium-long-range line aircraft as well as another certificate confirming that the plane fully meets the AP-25 Russian aviation standard, which is similar to European aviation standard JAR. These documents adopted by the Interstate aviation committee Air Registration Board allow Tu-204-300 to carry passengers both in Russia and abroad. The plane can be optionally delivered in any configuration.

The base variant allows for a three-cabin economy class passenger compartment with 157 or 155 seats. Other variants are also provided, particularly a combined one designed for carrying 142 passengers, of which eight – in business class and 132 – in economic class. Business class seats are equipped with individual information-and-entertainment complexes allowing seeing films and airline news materials in flight and getting the basic flight information such as the actual altitude, speed, and aircraft coordinates. In addition, the passengers can see the view from the flight deck transmitted by the camera fixed in it.

The Vladivostokavia air company became the first Tu-204-300 buyer. Within 2005, it will acquire a batch of four aircraft. The first two planes with side numbers 64026 and 64038 will be put into operation as early as he nearest future. Also, there is a package of orders for the plane from a number of other airlines.

Ten days later, at the ceremony of delivering the first Tu-204-300 plane to the Vladivostokavia air company Igor Shevchuk said the Tupolev JSC had got 60 bids for that liner.

Tatiana Anodina, Chairperson of the Interstate Aviation Committee and Chief Executive Officer of the International Union of Aviation Industry and Igor Shevchuk, President and Designer General of JSC Tupolev

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Alexander Shengardt, Chief Designer of Tupolev-154

Alexander Inozemtsev, Director General and Designer General of Perm-based JSC Aviadvigatel

CONCENTRATION ON THE DEVELOPMENT

The interview of Denis Manturov, the director general of the OPK Oboronprom joint stock company to Air Fleet magazine

What strategy is pursued by the OPK Oboronprom open joint stock company regarding helicopter-building enterprises? What are the ways and milestones charted for integration of the Mil-helicopter designers and manufacturers?

Analyses of the situation in the aircraft-building industry show that it is rather unbalanced today as far as helicopter-wise requirements and practical means of meeting them are concerned. This instability impedes technological advancements in helicopter development and production, retention of qualified personnel, and growth of indigenous helicopter competitiveness in the world aerospace market.

This is why the Oboronprom's main objective in the helicopter-building sector is to define, besides our holding structure, the concept and strategy of how to develop this sector in Russia, and set up a programme of modern helicopter-building based on comprehensive analysis of international and domestic helicopter operations, state and market requirements, as well as trends in aerospace science and technology. We think that the new programme must set priorities for helicopter technology development, define helicopter types and dimensions, earmark amounts of financing for projects carried out in the interests of power agencies of the Russian Federation and its military-technical cooperation with foreign states, streamlining normative and standards base to regulate the sector's evolution, degree of state support, and other measures.

We think it equally important to preserve the two world's renowned schools of helicopter design, and look forward to constructive cooperation with Kamov company.

What are the helicopter holding plans for such cooperation with Kamov Company?

The management of the helicopter holding has positive plans of cooperation with Kamov Company, but at this moment I cannot specify when and how they will be realised.

In my opinion this process should end by a merger. Naturally, both design schools should be saved, while their productive facilities, economic and financial capacities integrated and redundancies eliminated.

Each company has developed its own line of business with good positions in it. Speaking now nothing of Mil helicopters, I would say that Kamovs have their own market niche that must be retained.

How do you think the design schools could continue? Once integrated, may they compete inside or should they tend separate fields?

I believe the two helicopter design and development schools should take advantage of their expertise rather than compete within. If we remember Kamov's experience, it has to do mainly with shipborne basing, fire-fighting, timber skidding, and agricultural applications. For such operations the co-axial layout offers certain pluses. As to combat missions (we won't touch upon a Ka-50 vs. Mi-28 competition) and transportation, they are traditionally done by Mils.

We therefore plan to make a maximum use of the two schools' strengths when integrated. As to competition and internal bidding options, time will prove whether they are required or useless. If one evokes competition as a prime-mover of technical progress, then Russian helicopter producers meet with rather harsh competition in the international market.

The Oboronprom is perhaps the only organisation in the Russian defence industry with the positive holding formation history. What stumbling blocks can you see on the way of establishing the United Aircraft-building Company, and to what problems do you think its organisers should pay special attention?

Many of our problems still remain unresolved since the helicopter holding is in a formation phase until now. The Sukhoi Holding had been a pathfinder, and we took account of their mistakes which was quite helpful. But our business plan concentrated on the development of the inter-plant economic relations within the holding. It may seem not totally beneficial for the corporation today, but the principles that we institute at the holding's foundation will show their positive worth in future: cooperation maturity is a time-consuming process.

I reckon that a decision to establish the United Aircraft-building Company (UAC) has been long overdue. But what difficulties will have its organisers is another cup of tea. And difficulties they will have for sure. It seems that the UAC establishment will represent a most complicated legal issue of merging state and private capitals. And at this moment it is hard to predict what shape this problem will take. However, interests of the private capital should undoubtedly be guaranteed. My hopes rest on the premise that such a leader as Boris Alyoshin, who initiated the UAC establishment, will find decisions wise enough to smooth over angles.

Does it mean that there is no legal base for setting up holdings in Russia yet?

Yes, unfortunately our legislation does not contain a complete set of regulatory instruments necessary for holding formation.

How does the helicopter holding intend to build its relations with designers of helicopter engines, avionics and other systems?

These relations should be defined as early as possible at helicopter design or upgrading phases. I regret to say it but we do not have any new helicopter developments to boast about, being mainly busy modifying the Mi-38 and Mi-28 helicopters. We maintain rather active cooperative

The Oboronprom United Industrial Corporation is a multi-business investment-production group established in 2002 as a closed joint stock company by the Rosoboronexport State Corporation together with the Gosinkor State Investment Corporation. Its authorized capital stock comprised production assets in the defence industry sector. After the liquidation of the Gosinkor in 2003, its share was passed to the Federal Agency for Federal Property Management. The corporation was then re-registered as an open joint stock company. At present its corporate stock is owned in equal parts by the Federal Agency for Federal Property Management and the Rosoboronexport State Corporation.

In accordance with the Presidential Decree "On the open joint stock company "United Industrial Corporation "Oboronprom" dated 29 November 2004 and Resolution of the Government of the Russian Federation dated 6 May 2005 the corporation becomes a head managing and possessory company for the helicopter-building holding with the federal share of 51%.

The authorized capital stock is completed with shares of the Ulan-Ude Aviation Plant (63.12%, including those belonging to the Rosoboronexport), Moscow Mil Helicopter Plant (31%), Stupino Machine-building Production Association (38%), and Kazan Helicopter Plant (29.92% owned by the Republic of Tatarstan).

The Oboronprom controls more than 75% of shares of the Oboronitelnye Sistemy JSC, a leading enterprise and central company of the inter-state financial-industrial group - Oboronitelnye Sistemy. The Oboronprom also owns 100% of shares of the Oboronpromleasing and 25.1% of shares of the OKB Sukhoi open joint stock company.

ties with avionics manufacturers as far as upgrading is concerned. This cooperation is of a paramount importance when helicopters to be upgraded are operated abroad.

It makes no secret that many attempts have been and are still undertaken to upgrade these helicopters without receiving approval of their Russian designers and manufacturers. For the last two or three years we have signed cooperation agreements with such companies as Sagem (France), BAE Systems (UK), IAI (Israel) and ATE (Republic of South Africa), namely those who promoted rather aggressively their own modernisation programmes for Russian-made rotary-wing systems.

The corner-stone of our approach to modernisation is the premise that systems integrator should be a Russian company (either Technokomplex or Russkaya Avionika) even if components are Western-made. Sometimes components can be manufactured by Western companies (BAE or Sagem), but overall integration must be done by a Russian company. Of course, it is not always so. For instance, the French are the prime contractor for the Mi-26 bidding in the heavy-lift helicopter tender for the NATO armies. But I repeat that it is our condition Number One for a helicopter upgrading contract that the systems integrator should be a Russian company.

What upgrading programmes are under way to allow the Mi-8/Mi-17 helicopter, the most popular design in its class, to retain its market positions?

We plan to continue upgrading the Mi-8/Mi-17 helicopter profoundly to maintain its trade value for the next 15 – 20 years at least. The helicopter fits well into its specific "cost-effective" category - and we are actually unable to raise its cost: this helicopter, even fully modernised, would not cost as much as its rivals do.

Re-modernisation is the word to name what is happening to the Mi-8/Mi-17 helicopter: new technologies, first incorporated into the Mi-28 and Mi-38 designs, are now being actively transferred to the Mi-8/Mi-17. We have explored replacing the Mi-24 tail rotor with the Mi-28 X-tail design. The Mi-38 main rotor fibre-glass blade technologies are also used in the Mi-8/Mi-17 upgrades. The works conducted by series-production plants together with the Mil Design Bureau yield truly good results. For example, the helicopter's lift capacity has been increased by one tonne merely by adjusting the main rotor blade airfoil curve and substituting the airframe materials.

The re-modernisation produces a practically new helicopter. The only difference from the traditional design process is a greater time span. But it is a most preferred and, in most cases, the only way, considering the present economic conditions in Russia.

What is the marketing policy of the helicopter holding? Do you think that complete delivery is feasible regarding various articles of aviation materiel in particular?

Complete deliveries of aviation articles are carried out even now. For example, the contract with Venezuela foresees deliveries of both Mi-17, Mi-35 and Mi-26 helicopters. Ultimately, everything depends on a customer looking for a concrete type of equipment: we are in position to offer him a wide gamut of rotory-wing craft for both combat and transportation purposes.

In selecting our exporting company we follow a simple guideline that the helicopter is a dual-use technology: today's civil-purpose air vehicle may turn out tomorrow's military-purpose air system after installing weapons suspension. Therefore I think that the main role in helicopter sales must be always played by the Rosoboronexport. This state-owned company has a network of representation offices all over the world engaging an important staff of professional agents to handle complex issues when drawing up contracts on both hardware delivery and its follow-on logistic support.

Civil-purpose helicopters we shall sell ourselves. The Moscow Mil Helicopter Plant is charged with marketing coordination within our emerging holding and will have there a dedicated structure.

When will the next annual meeting of the Oboronprom's shareholders take place? Can you say if the corporate annual report for 2003 is available for study and whether there are plans for publishing such a report for 2004?

The annual meeting of the OPK Oboronprom's shareholders is planned to take pace by end-June. We have only recently entered the road to annual report publishing. Today we are content with preparing annual operations summaries for the Board of directors. I must add even more that some data on the Oboronprom's operations are classified as state secret in view of the defence enterprises under our management. We shall try to do our best to provide maximum data for public.

What is your assessment of Mil-type helicopter domestic and foreign sales at present and in a foreseeable future?

It is no secret that more than 95% of current helicopter sales are destined for export: mainly Mi-17s, some Mi-35s and piece deliveries (one or two) Mi-26s annually.

I cherish no special optimism regarding prospective domestic sales – their growth promise is far-off. In the best of scenarios only the Russian Air Force can become our main state customer capable of mass procuring both transport and combat helicopters. We have already obtained the first order to supply 50 Mi-28s to the Air Force by 2010. As to transport helicopters, the Air Force expects marked reduction of their fleet's flying life to occur in 2 to 3 years, nevertheless I do not think that our armed forces will start procuring foreign-made helicopters. If one considers Russian air carrier companies, the most important helicopter operator among them – the UtAir Company, is focused on buying the Mi-26 heavy-lift vehicles. Talks on delivery of some number of these helicopters are under way just now.

To support domestic sales we intend to apply the whole gamut of financial instruments, as well as leasing. Our own Oboronpromleasing company has made a good showing during its two years of operations. Last year, for example, its volume of transactions was around $40 mln. The company was mainly engaged in lease deliveries of manufacturing equipment to enterprises, but from this year it has begun to actively offer helicopters for lease. With our subsidiary company we shall be able to devise rather promising business schemes. As to other operators in the Russian aviation leasing market, such as the IFK and FLK, we are ready to cooperate with them. We have one common task to manufacture and sell a maximum number of Russian-made helicopters, so we shall use all means for doing this.

What are your views on information activities of the helicopter holding and the Oboronprom as a whole?

To improve communications with press we have formed a service charged with this work. We also have opened our web-site: www.obronprom.ru.

As to exhibitions, I should underline that the Oboronprom is a managing, not manufacturing, company. We do not want to advertise the Oboronprom itself, while manufacturing entities, who we control, do need such advertising. We may mention foreign analogues here, such as United Technologies Corporation which owns Sikorsky and Pratt-and-Whitney companies: it is the manufacturers who are advertised. We are not going to constrain advertising activities of our serial plants but it is only natural that they shall be centralised as far as possible to avoid redundancy and excessive expenses. It would facilitate better presentation of the Russian helicopter building as a whole, and the brand of Mil helicopters.

When discussing public openness, I must stress that the Oboronprom tries to publicise its activities to a maximum degree, with the only limits laid here by the law on state secrets, as we are working with defence enterprises.

What lines of business of the OPK Oboronprom do you consider most worthy of coverage in trade publications? What reader audiences are most valuable for the corporation?

Our main missions are to manage efficiently the Oboronprom's assets and to attract investments into the industry. I consider them to be the most important themes for coverage in trade publications. Another equally important is promotion of the corporate products: helicopters and air defence systems.

Among key audiences from the point of view of our corporation I would single out representatives of executive and legislative bodies at both federal and regional levels, military and business circles, and potential buyers of our products both in Russia and abroad.

What do you think of press covering developments in the Russian defence industry?

There are grudges against the press caused mainly by its incompetence. After all, defence industry is a rather specific area of professional activities, and its inner processes coverage demands expert knowledge of journalists.

In spite of the said, I consider press coverage as a necessary requisite. In our talk we mentioned gaps in Russian legislation on holding formation. Wide discussions in press of problems related to holdings could help prevent errors and adopt timely amendments to passage of corresponding statutory instruments.

The Oboronprom helicopter-building holding's comprehensive programmes on:

- **corporate development strategy**
- **research and development, prototype and series production of military and civil-purpose (including state-ordered) aviation systems**
- **scientific and innovative activities, venture business development**
- **science-intensive products development and production, dual-use aviation systems and business-class helicopters development**
- **marketing strategy development based on domestic and foreign market research and its implementation in the potential areas, sales structure improvement**
- **corporate research and development, flight-test, laboratory, test-bench and production bases improvement**
- **technical retooling, equipment and restructuring of series-production enterprises**
- **introduction of IT, CALS technologies, CAD systems, software complexes, single corporate computerized information and analysis system for secure planning, management and data exchange**
- **quality assurance; development of a system of corporate norms, methods and standards for quality and reliability assurance, and logistic support, harmonized with international standards**
- **development of aviation life-cycle logistic support system and its positioning with the international codification and on-condition maintenance system**
- **setting-up and optimization of fiscal tools for strengthening corporate economic status and stability, enhancement of reliability and strengthening of enterprises' financial positions in the republican and regional budgets**
- **attraction and utilisation of capital investments to implement target programmes, develop advanced prototypes of aviation systems, new technology exploration, leading-edge technologies, capital construction, technical retooling and re-equipment**
- **improvement of staffing and social protection policies, personnel recruitment and training, reforming of administrative and management practices of the enterprises within the corporate management system**
- **corporate activities in the areas of international cooperation and military-technical assistance.**

RUSSIAN HELICOPTER CERTIFIED IN BRAZIL

The Mi-171A-1 helicopter is the main actor of the presentation dedicated to its certification

On the eve of LAAD 2005 exhibition (26 - 29 April 2005, Rio de Janeiro, Brazil) it was announced that the Mi-171A-1 Baikal multi-purpose helicopter achieved Brazilian certification. That was the reason why the helicopter became the main exhibit of the Russian exposition, displayed both at static site on ground and in the air.

Left to right: Denis Manturov, director general of the OPK Oboronprom JSC, Andrey Shibitov, Director General of the MVZ named after Mil, Leonid Byelykh, Director General of the Ulan-Ude Aviation Plant

The Mi-171A multipurpose helicopter has been designed by Moscow Mil Helicopter Plant and manufactured by Ulan-Ude Aviation Plant. Its certification was supported by the Air Register of the International Aviation Council (IAC) of the Commonwealth of Independent States in accordance with the Technical Agreement on Airworthiness approved by the IAC and the Brazilian Aerospace Technical Centre (CTA) dated 28 April 1998. The Mi-171A helicopter had been certified in Russia a year before obtaining Airworthiness Certificate No 132-171A dated 3 July 1997. In keeping with the Technical Agreement the Brazilian Side accepted data gathered by the IAC's Air Register during the helicopter initial certification tests, while handing over to the helicopter designer the Supplementary Specifications to patch up differences between two certification systems of the IAC's Air Register and Brazilian CTA.

The standard helicopter design was modified to meet the Supplementary Specifications. In contrast to the baseline helicopter the Mi-171A-1 "Brazilian" version is fitted with independent engine fuel supply system featuring increased-capacity external fuel tanks (without feeder tank), two-chamber control system actuators, steel fire-proof engine cowls, steel oil tank in the engine oil system, separate electric power wiring, Western-origin avionics. After its first flight made on 11 August 2004, the Mi-171A (No. 1311) helicopter started flying its certification tests. Experts of the IAC's Air Register evaluated compliance of the helicopter airframe characteristics with the requirements set by the Brazilian CTA. It was the Air Register that submitted validation results to the CTA. The certification was completed this April.

The Mi-171A helicopter has become the first Russian aircraft officially certified for flight operations in Latin American countries. As the Brazilian airworthiness standards are recognized by all countries of the continent, the certificate opens good prospects for the helicopter's promotion to the Latin American market. It can accommodate several dozens of the Mi-171A civilian helicopters. In addition, some Latin American countries have expressed interest in its military version – the Mi-171Sh. Deliveries of the Mi-171A-1 helicopter are expected to start in the coming months.

Left to right: Denis Manturov, director general of OPK Oboronprom JSC; Alex Zilber, Clapham Inc. (USA); Sergei Svechnikov, chief of the Centre for Analysis and Prospective Forecasts of Rosoboronexport

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Vnesheconombank is one of the oldest banking institutions of Russia. In December 2004, it will celebrate the 80th anniversary of its performance. Throughout the years of its successful performance, the Bank has established extensive and reinforcing global business contacts and is known to the global business community for its professionalism and impeccable record. It is widely viewed as a solid and reliable partner.

Vnesheconombank is mainly state interests-oriented and focused. Over the years, the Bank has gained in-depth expertise and market intelligence in financial support of intergovernmental agreements. Being a specialized financial institution, Vnesheconombank takes an active part in implementing major international and national projects and programs launched within the territory of Russia and beyond. Underpinning the projects success lie financial feasibility studies, as well as cost-benefit analyses, which, as a rule, the Bank's staff attributes great importance to.

Also, Vnesheconombank has assumed responsibility for keeping records and servicing sovereign foreign debt and foreign financial assets.

Equally important, by the Decree of the Russian government the Bank has been designated as a Pension Fund agent and is currently entrusted with a challenging task of investing the Fund's assets into the Russian government securities. In January 2003, Vnesheconombank was awarded a status of the State Trust Company to manage the pension savings of the people.

A major area of Vnesheconombank's performance is an active participation in elaborating key state policy instruments designed to ensure domestic exports support and promotion. Drawing on global experience, in particular, the expertise and practices of the Organization for Economic Co-operation and Development (OECD), as well as taking full account of the World Trade Organization (WTO) rules and regulations, the Bank is intent on developing effective mechanisms to assist Russian high-tech industrial exporters win a share of global markets. Vnesheconombank owns 94,6 per cent of EXIMBANK OF RUSSIA, which is to become a major institution to support Russia's exports.

Vnesheconombank is one of the few Russian banks effecting lending and guarantee operations based on borrowed funds under major projects without respective counter-guarantees being issued by the government of the Russian Federation.

Vnesheconombank's performance is assessed by the major international rating agencies. By long standing tradition the current short-term and long-term credit ratings assigned to the Bank are at par with the sovereign rating of Russia.

The Bank's financial performance is audited by Ernst & Young.

PILOT'S LIFE IS MORE VALUABLE THAN PROFITS

Editor Alexei Zakharov talked with the director of the 121st Aircraft Repair Plant of the Russian Ministry of Defence situated in Kubinka Yakov Kajdan.

How has the repairs system adopted in the Russian Air Force changed in new economic conditions?

The Russian Air Force has changed drastically its repair and overhaul activities in recent years. Suffice it to say that we have only 23 military aviation repair plants out of 62 that existed in the USSR. Most of them are now in the territories of former Soviet republics, but this is not the sole cause for their reduction. In new and demanding conditions some plants could not compete and were disbanded, or turned into repair shops, or merged with more viable plants.

The second major change is connected with the establishment of regional, so to say, military aviation repair centres. Today there are four such centres. The Far Eastern Regional Centre comprises three plants providing repairing services for front aviation units in areas stretching from the Ural Mountains up to the Chukotka Peninsular. The Southern Regional Centre takes care of Yeisk, Krasnodar, Novocherkassk, Taganrog. The North-Western Centre includes aircraft repair plants situated in the Leningrad and Kaliningrad regions. The Central Regional Centre is formed by the aircraft repair plants in Ryazan, Kubinka, Ivanovo and Rzhev.

Repair plants are also divided according to their specialisation. There are two full-cycle repair plants: the first one is our plant for front-line aircraft, and the second one for military transport aircraft is in Staraya Russa. Helicopter repair plants have their organisation. There are also repair plants specialised in restoration of airframes, aero-engines, units, etc. The reorganisation has affected the whole Air Force repair system.

I consider as very important that all aircraft repair plans are certificated in accordance with the requirements of ISO 2001 and Russian standards.

Although many repair plants have passed over to other CIS countries, the reorganised plant network in Russia provides reliable repairing and overhauling services for all types of aircraft in service with the Russian Air Force.

Some 10-15 years ago the 121st Aircraft Repair Plant was considered to be absolute leader in the repair system of the Air Force, as regards repair nomenclature, production base and technological processes. Is this leadership retained today?

It would have been indiscreet to boast that we still hold the first place. I would rather say that we are among leading repair enterprises of the Air Force. The most recent overall inspection of the economic and technical statuses of the repair plants has shown that the 121th aircraft repair plant is the first or second place-winner for the overwhelming number of parameters. There are both objective and subjective reasons for this.

The objective reasons include, first of all, excellent geographical situation of our plant correlating with tactical aviation basing in the European part of Russia. The second benefit is our availability for export order implementation. The third advantage consists in neighbouring a great majority of leading aerospace designers and manufacturers located in the Moscow Region.

Among subjunctive reasons I mention but one. In spite of reducing our staff almost thrice, we have managed to retain the most skilled staff. The average age of our specialists is 48 years: they are experienced and highly qualified.

I could list other reasons for our keeping up high status, but I think the two I just mentioned will do, being the most important.

For a long time Kubinka Plant has been kind of a proving ground for new technologies, sharing its experience with other plants. Is it still so today?

Kubinka Aircraft Repair Plant has remained a proving ground as before for the whole repair system of the Air Force. We are the only plant in this country that upgrades the Su-25 aircraft to the SM version. We have just finished upgrading the first four prototypes of this type coming over to its serial modernisation.

Other repair plants are also engaged in upgrading, such as Rzhevsk repair plant (Su-24 type aircraft), Ivanovo plant (Yak-52 Air Force trainers), and Taganrog plant (An-12 military transports).

In the current economic situation aircraft repairs and upgrades become relevant today and will remain such tomorrow. Aircraft repair facilities can perform not only repairing but also upgrading of military aircraft within the Air Force, without transferring them to the industry.

How are your plant's works structured and financed?

The state order takes up less than 50% of the plant's workload, all the rest are direct contracts, mainly export ones furnished by the state export intermediary, as well as some contracts we find ourselves.

It is regrettable that we, military repairers, cannot fulfil the whole volume of work required by the Air Force because of insufficient financing. The workload of all aircraft repair plants is not exceeding 50%, even with export and third-party contracts included.

Introduction of new repair technologies and, especially, transition from repairing to upgrading require adequate production equipment. What can you tell about your plant in that respect?

We have been re-equipping our production base for many years in accordance with annual strictly followed plans with some successes to report. For the last two years the plant has introduced more than 120 innovations spending on them about 27 mln roubles.

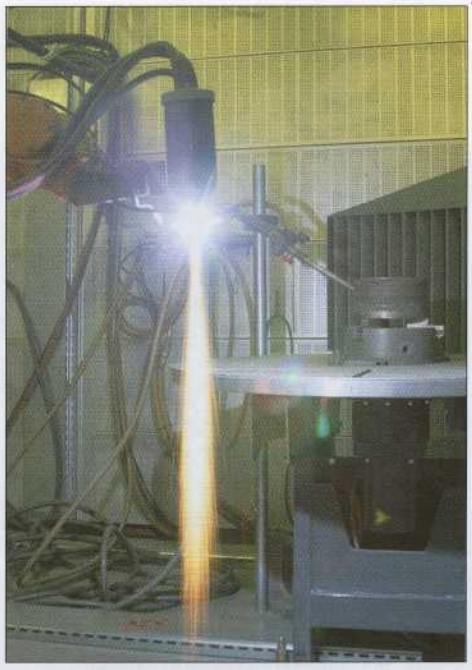
Among most interesting latest innovations I would first mark an automated test data recording system for the AL-31 aero-engine. It helped us to eliminate the negative influence of human factor during engine tests. The digital test system measures and records more than 100 engine parameters that are then integrated into data bases used for statistical calculations and evaluations. This system makes up an important block in the AL-31 engine repair quality enhancement programme.

The second example of a new technology application in aircraft repairs is a robotic gas-thermal sputtering system. We have introduced this system, based on equipment made in Germany by Siemens company, with the assistance of the Russian Institute of Protective Coatings, and operated it for more than a year, fulfilling not only our own works but other plants' orders as well (for example, those of Gatchina and Yeisk Plants). We are searching for outside plating orders where such technologies are most needed (railways and printing). Our marketing department attracts outside customers to recover modernisation costs.

My third example of production modernisation will be a test bench development for the M-14 engine. Installation of special diffusers helped us to improve test quality and ecological environment in the test room.

But the M-14 piston engine for the Yak-52 aircraft deserves more time. Two years ago we recommenced repairs of the engine with upgrading it to the M-14Kh version providing increase in gas-dynamic stability and power (the latter incremented by approximately 40 hp). It must be said that our test bench is a unique facility: even the manufacturing plant in Voronezh has nothing of the sort. It has been developed by our designers, manufactured by our workers and certificated in the VIAM All-Russian Institute of Aviation Materials and TsIAM Central Institute of Aviation Motors. During bench testing of the M-14 engine we also use our torque meter developed with a unique know-how of our experts. All these innovations have allowed us to enhance efficiency of the engine testing and, as a result, quality of its repairing.

Another example of innovative technologies introduced late last year is a laser cutting facility used for manufacturing small-sized and, seemingly, minor pieces, such as washers, spacers, and the like. Although their cost is not important, their supplies have often been delayed causing us to lose time. The robotic laser cutter for steel sheet and bar materials made us immune to part supply irregularities. The facility is also used for fulfilling outside orders. For example, an important contract on works for RSK MiG aircraft-building company is prepared for conclusion, with other options studied.



What strategy will the 121th aircraft repair plant have in the near future?

In recent years we have mastered repairs of more than 200 aviation items. It is a basic fact that the 121th aircraft repair plant can process now practically all types of front-line combat aircraft offering unique comprehensive repair services. The Su-27 will get airframe and engine, as well as all aircraft systems and units renewed. The same approach is offered for the MiG-29s, all modifications of the Su-25s, as well as for MiG-23s and MiG-27s on export contracts.

We have mastered repairs of the GP-21 generator installed on both military and civil aircraft. This fits into our general strategy of acquiring repair

capabilities for as many as possible dual-purpose units. Such approach may help us penetrate into new markets, other than military aviation.

At present there is a working panel of the Interstate Aviation Council of the CIS finishing its inspection of the plant. And we are expecting to get certificated soon for repairs of the AI-9 turbo-starter and the M-14 engine on civil aviation orders. With both civil and light general aviation showing interest in such services, we expect to further expand our operations.

What is your attitude to export orders?

I don't consider them as cure-all – they don't bring big revenues. In fact, their implementation tends to become more and more labour-intensive and costy. Technical condition of aviation materiel arriving for repairs from abroad is ever getting worse. Spare parts for many types of vintage aviation materiel are practically out of production. All these factors make export repairs economically less rational. Nevertheless, they are considered important for the plant at least to load its production lines and retain qualified personnel.

At present we accomplish several foreign orders contracted though state export intermediaries, mainly through Rosoboronexport and RSK MiG. The former is seen as preferable being more reliable as far as financing of works is concerned.

Many export contracts have articles with provisions for repairs quality control, and we have been receiving representatives of air forces from many foreign countries. All of them have been satisfied with how we repair. Many of them told us that they would recommend to their leadership our plant for indication in future contracts as a prime contractor. I understand that such decisions depend also on politics, but

I am glad that foreign customers made such appraisal of our plant. We are also positively evaluated by the Federal Service for Military-Technical Cooperation of Russia which recommends our plant to Rosoboronexport as a reliable partner.

What is your opinion of competition between aviation repair plants from different CIS countries in third countries' markets?

Such problem does exist. While repair cost is maintained at a normal level, Russian repair plants have upper hand. When a customer refuses to pay normal prices, all at once competitors from other countries loom ready to work for a smaller price. It concerns aircraft repairs as well as engine and, sometimes, unit repairs.

There have been attempts to agree on normal cooperation in aviation repairs, both at leaders' and executives' levels, but, unfortunately, the situation remains stale.

Your colleagues from Ukraine and Belarus are actively contacting leaders of aviation repair plants from East European countries. Has your plant established such contacts?

Unfortunately, we have no such contacts. We do know that Ukrainian directors (I know nothing of Byelorussians) take part in some coordinating body for repair plants from the CIS and East Europe. They hold regular meetings to discuss issues of mutual interest, including their presence in particular markets of aviation repairs.

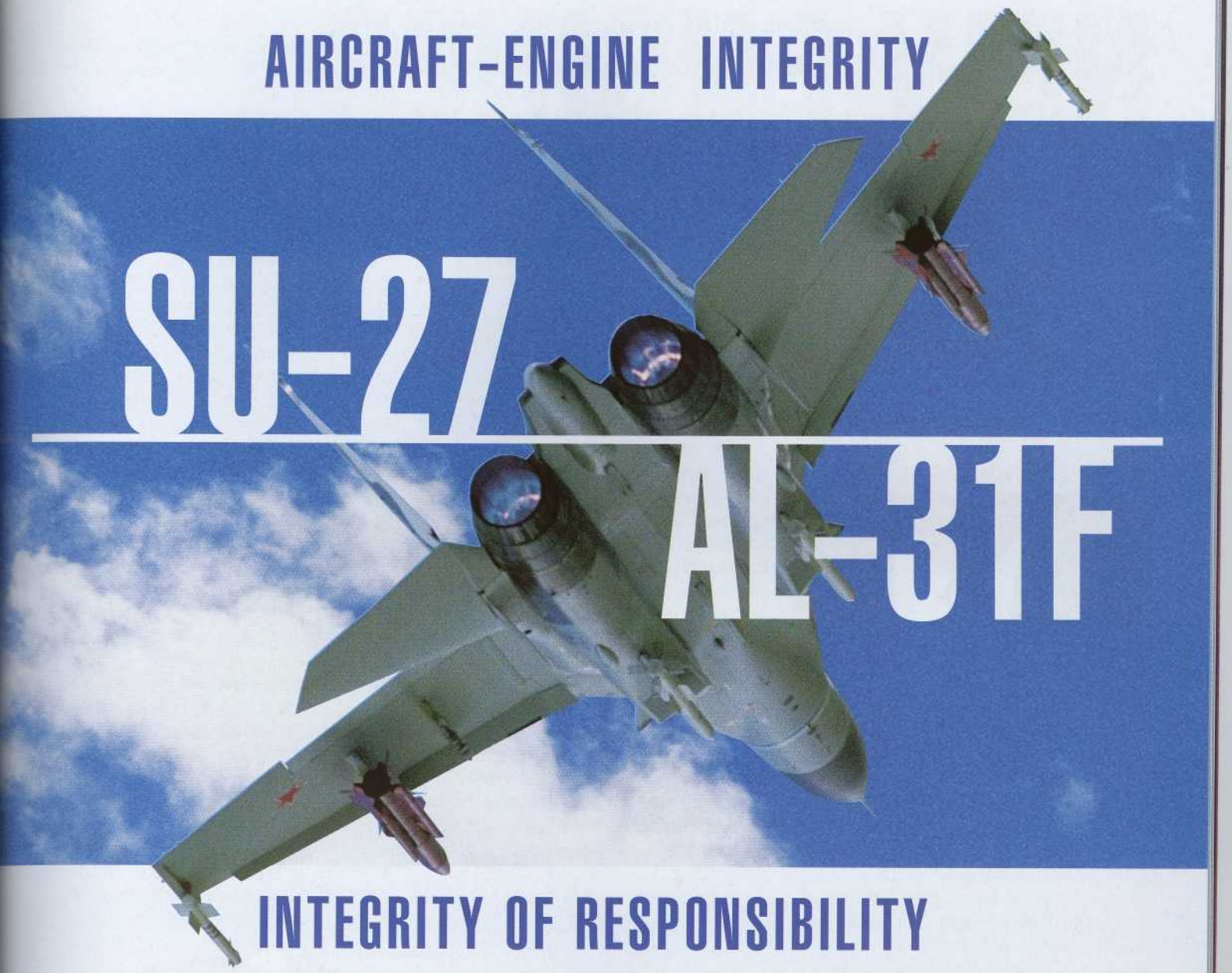
I cannot comment why Russian aviation repairers take no part in this activity - such issues are prerogative of our leadership. But I believe we should not fail to use this opportunity to communicate. It is important both politically and commercially to promote cooperation and organise a civilised market of aviation repairs.

Well, here is our last question. Nowadays there are lots of certificateless spare parts and low-quality units in the market that appeared there as a reaction to monopolistic stance of certain manufacturers and ensuing pricing policies. Have you ever met with them?

Certainly, we have. And we firmly state our position in this respect: our plant will never use a single certificateless spare part, be it a screw-bolt or a major assembly. Pilot's life is more valuable to us than the profit.

We thank you for the interview. May repaired aircraft leaving the 121th aircraft repair plant always be as good as new!

AIRCRAFT-ENGINE INTEGRITY



SU-27 AL-31F

INTEGRITY OF RESPONSIBILITY

Current trends in warplane development dictate life cycle extension for aircraft, their power plants, avionics and weaponry. In keeping with this tendency, 121st Aircraft Repair Plant has worked out a new philosophy, under which the aircraft and its engine are repaired as a single whole, while simultaneously modernised for enhanced combat potential.

121st Aircraft Repair Plant possesses all the requisite elements — qualified personnel, cutting-edge equipment and a clear vision of the future — for implementing this philosophy.

Making Future Today!

AIRCRAFT REPAIR AND MODERNISATION: Su-25, Su-27, MiG-29 AND MiG-23, ALL MODIFICATIONS

AERO ENGINE REPAIR: RD-33, AL-31F, R-27F2M-300, R-29-300, GTDE-117-1, VK-1TM, AI-9, AI-9V, M-14P

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NEW ENGINES FROM IVCHENKO-PROGRESS

Muravchenko
Fyodor Mikhailovich
Designer General, Hero of Ukraine, Academician, Doctor of Science (Engineering)

The "Progress Zaporozhye Machine-building Design Bureau named after Academician A.G. Ivchenko" State Enterprise (Ivchenko-Progress SE) is one of the leading developers of aero-engines and gas-turbine drives for industrial units.

The enterprise has gained a lot of experience in designing, developing, certificating, servicing and updating various types of aero-engines and ground-based power units.

At the Ivchenko-Progress SE were designed such famous engines, as:

- AI-20, the USSR's first turboprop engine with long service life
- AI-25, the USSR's first bypass engine for short-haul aircraft
- D-36, the USSR's first three-shaft turbofan engine with high bypass ratio
- D-18T, the USSR's first turbofan engine of more than 20-tonne thrust
- D-136, the world's most powerful helicopter engine
- D-27, the world's first propfan engine.

The Ivchenko-Progress aero-engines are installed on 57 types of aircraft flown in 109 countries worldwide. These engines embody a high level of design and development expertise which is confirmed by certificates of the Aviation Register of the Interstate Aviation Committee of the CIS countries and Veritas Bureau.

AI-222-25: the latest design in aero-engines

Advanced training aircraft are greatly needed today. They are supposed to have advanced flight controllability and stability characteristics comparable to those of modern and prospective fighters, as well as high cost-efficiency. There are also requirements for development of light attack aircraft and fighters derived from trainers. The above factors put on the agenda the issue of designing new engines for such aircraft with performance equal to that of the world's best military turbofans.

The Ivchenko-Progress SE is developing such an engine, the AI-222-25 turbofan, in cooperation with the Salut Federal State Unitary Enterprise (Moscow, Russia) and Motor Sich Joint Stock Company (Zaporozhye, Ukraine).

To reduce design time and cost the Ivchenko-Progress SE has used in the AI-222-25 engine the core of the AI-22 bypass turbofan being developed for the new Tu-324 regional airliner. The AI-22's full-scale prototype was started for the first time on 25 September 2000.

A development batch of the AI-222-25 engine is manufactured by the Ivchenko-Progress SE in cooperation with the Salut and Motor Sich who are supposed to produce it in series. The milestones passed in the AI-222-25 engine programme include: - beginning of the core bench tests in November 2002

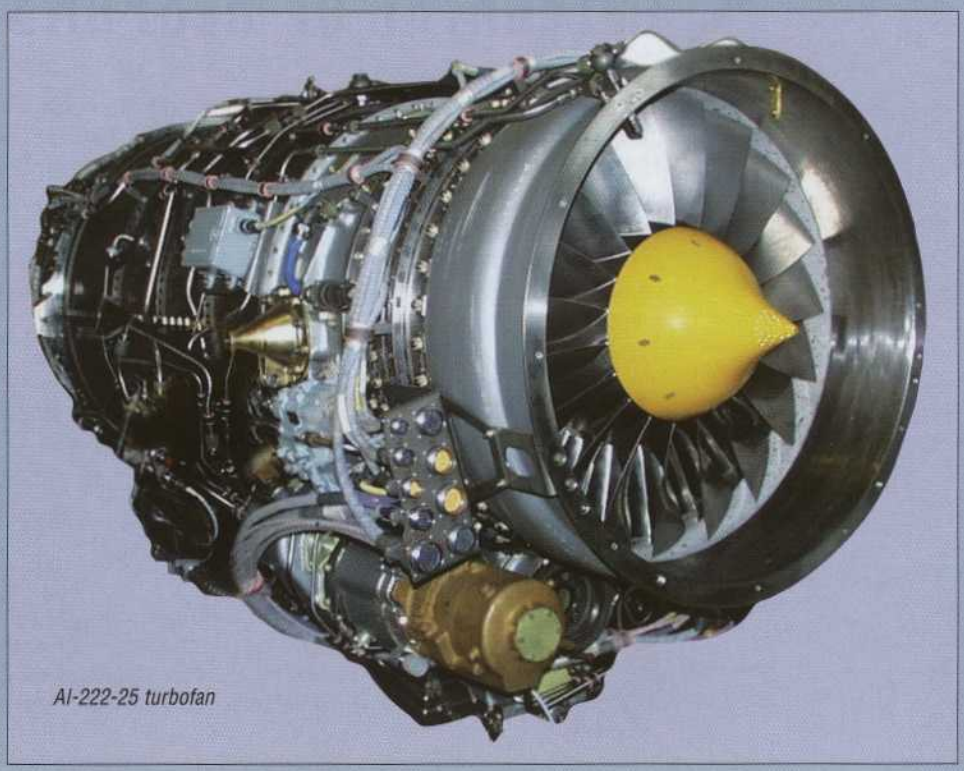
- first start of the full-scale engine in June 2003
- delivery of two engines for the first Yak-130 trainer in December 2003.
- Yak-130 No.1's maiden flight on 30 April 2004
- two more engines delivered for Yak-130 #2 in December 2004.

The AI-222-25 engine is planned for state certification bench tests in December 2005.

The AI-222-25 is a baseline engine for the AI-222 turbofan family intended for trainers and light combat aircraft.

The engine development progress

Parametric studies and design estimations have been carried out in accordance with the request for proposals aimed at the development of the AI-222 engine family offered for powering trainers, combat trainers and light combat aircraft. There is some interest shown in the following engine modifications: AI-222-25UVT and AI-222-28 turbofans, as well as AI-222-25F and AI-222-25KFK afterburning turbofans.



AI-222-25 turbofan

Yak-130 advanced combat trainer

AI-222-25UVT turbofan

Training/combat aircraft performance can be substantially improved by powering them with a vectored-thrust engine. A vectoring nozzle is specially designed to reach this objective. It is installed as a separate module on the flange of the AI-222-25 engine turbine rear bearing support. The module's design ensures all-aspect vectoring up to 20° off the engine axis.

To improve aircraft manoeuvring, takeoff and landing characteristics all AI-222 family engines can be fitted with thrust vectoring systems capable of ensuring all-aspect deviation of exhaust gas flow within 20 degrees off the engine axis. A flexible part of the nozzle is turned by hydraulic actuators on commands of the aircraft control system.

AI-222-28 turbofan

The basic design of this engine version features a turbine with an improved cooling system. The turbine with the D-27 engine's components will allow the new version to have considerably increased gas temperature, with the takeoff thrust going up to 2830 kgf.

The compressor sections of the AI-222-25 and AI-222-28 engines are fully unified.

AI-222-25F afterburning turbofan

An AI-222-25F afterburning version of the AI-222-25 turbofan engine with the takeoff thrust of 42,000 kgf (thrust reheat ratio is 1.68) is designed to power trainers, combat trainers and light combat aircraft with the minimum flight speed of Mach number 1.5. The turbine compressor section of the engine is fully unified with that of the AI-222-25 basic engine.

AI-222-25F afterburning turbofan main data	
Parameter	Parameter value
Full afterburning power/ SLS; ISA; σ_{inlet}=1.0	
Thrust, kgf	4,200
Specific fuel consumption, kg/kgf*h	1.9
Full afterburning power/	
H=11000 m; M =1.4; ISA; σ_{inlet}=0.097	
Thrust, kg/kgf*h	2,700
Maximum power / SLS; ISA; σ_{inlet}=1.0	
Thrust, kgf	2,500
Specific fuel consumption, kg/kgf*h	0.66
Dimensions/weight	
Inlet fan diameter, mm	624
Full diameter (afterburner), mm	810
Length,mm	3,070
Height, mm	1,084
Weight, dry, kg	560

AI-222-28 turbofan main data		
Parameter	Units	Parameter value
Max power/ SLS; ISA; σ_{inlet}=1.0		
Thrust	kgf	2,830*
Specific fuel consumption	kg/kgf*h	0.677
Max power/ H=6000 m; M=0.4; ISA; σ_{inlet}=1.0		
Thrust	kgf	1,400
Cruise power/ H=6000 m; M=0.5; ISA; σ_{inlet}=1.0		
Thrust	kgf	700
Specific fuel consumption	kg/kgf*h	0.83
Length	mm	2,100
Width	mm	860 (840)
Height	mm	1,084
Dry weight	kg	520

Notes: 1. Parameters are given with no account taken for air and power customer bleeds and losses in the aircraft exhaust system.
2.* Max power thrust is 2,800 kgf at $P_{amb.}$=746 mm Hg, t=+27°C and at $P_{amb.}$=760 mm Hg, t=+30°C.

AI-222-25KFK afterburning turbofan

The AI-222-25KFK features a short-length afterburner: its installation increases the AI-222-25 basic engine's full length by maximum 500 mm. This engine can be used to improve performance of the basic aircraft control system without the latter's significant retrofit. The short-length afterburner helps maintain a single afterburning power rating, thus simplifying the engine control system.

The AI-22 family engines can be offered, besides the Yak-130 trainer, for a number of other aircraft that are being developed or upgraded. Advanced characteristics, such as optimum thrust and fuel consumption, low noise and emissions, long service life and low operating costs, meet the 21st century performance standards and make the AI-222 family engines the best choice for the development of a wide range of highly competitive aircraft.

AI-222-25KFK afterburning turbofan main data	
Parameter	Parameter value
Afterburning power/ SLS; ISA; σ_{inlet} = 1.0	
Thrust, kgf	3,000
Specific fuel consumption, kg/kgf()h	0.95
Afterburning power	
H=11,000 m; M=1.4; ISA; sinlet = 1.0	
Thrust, kgf	1,490
Maximum power rating SLS; ISA; σ_{inlet} = 1.0	
Thrust, kgf	2,518
Specific fuel consumption, kg/kgf()h	0.643
Dimensions/weight	
Inlet fan diameter, mm	630
Full diameter (afterburner diameter), mm	810
Length, mm	2,512
Width, mm	860 (840)
Height, mm	1,084
Weight, dry, kg	520

D-436 engine family

The 7,500-kgf D-436T1 bypass turbofan, certificated in 2000, is flown at present on the Tu-334 passenger aircraft which passes through a flight test programme.

Development and series production of the 70-80-seat An-148 medium-haul passenger aircraft is one of the priorities of the Aviation Industrial Development State Programme of Ukraine.

The Ivchenko-Progress SE has developed the D-436-148 bypass turbofan engine (a modification of the D-436T1 bypass turbofan engine) for the new An-148 passenger aircraft. Its maiden flight powered by the engine was performed on December 17 2004.

The enterprise continues developing other bypass turbofan engines falling into the D-436 engine family with thrust values ranging from 6,400 to 12,000 kgf, intended for new large-capacity and cost-effective aircraft.

Its three-shaft turbofans with high bypass ratios, such as the D-436T1/TP, D-436T2, D-436T3, D-436-148, are modified versions of the D-36 family engines. The D-36s have been widely used on the Yak-42, An-72, An-74,

An-74TK-300 aircraft having accumulated 8-mln flight hours and demonstrated high operational reliability.

New versions are designed to meet on-condition maintenance requirements and are provided with advanced testing and fault-finding systems. The Ivchenko-Progress SE offers today new engines of the D-436 family having a service life of 20,000 cycles with shop visits for module replacement after every 5,000 – 6,000 cycles of operation.

The corporate strategy for the D-436 engine family evolution consists in step-by-step improvements of engine components during follow-on development of its modified versions. Thanks to the use of a new wide-chord low-tip-speed fan without shroud platforms being developed and turbine entry temperature increase by 50-60°K, the D-436T2 bypass turbofan engine is expected to have its thrust increased by roughly 10%, specific fuel consumption reduced by 2-3%, and its noise characteristics improved.

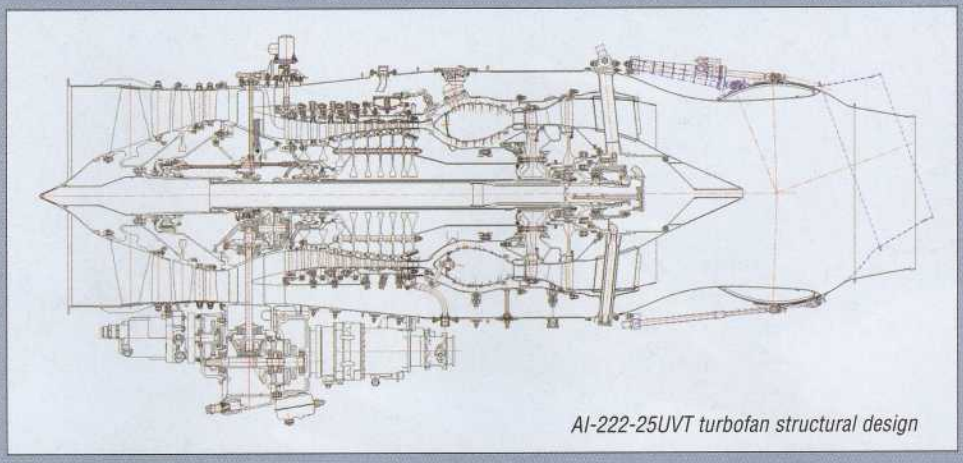
The D-436T3 engine with a low pressure compressor featuring an additional "zero" stage (successfully operated on the AI-336-10 industrial gas-turbine drive) will have its thrust augmented by 12% without any increase of entry gas temperature.

Aircraft powered by the D-436T1/TP basic engine and its new modifications will generate noise on terrain during take-off and landing at a level lower than specified in Chapter 4 of the ICAO Standard by at least 10 EPNdB, estimated by summed-up levels measured in three test points. The engines' emission level is lower than the ICAO current standards by 40-50%.

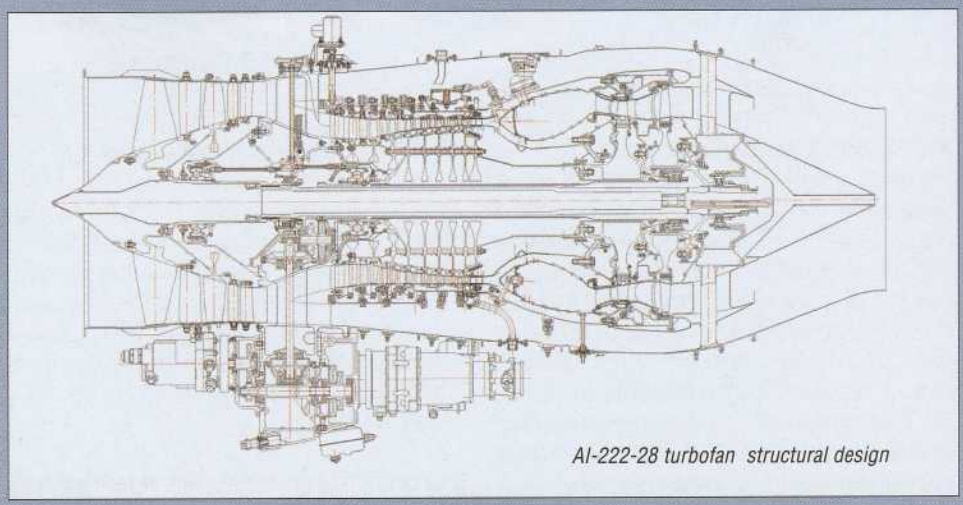
Future engine versions are supposed to have fewer compressor stages, upgraded turbine and combustion chamber to ensure a gas temperature increase by 100-150°K, introduction of new materials and technologies.

A 12,000-13,500-kgf modification of the D-436TX engine featuring a wide-chord noiseless fan driven by a reduction gear is also under development. It makes use of the D-436T3 engine's compressor, upgraded combustion chamber and turbine (their prototypes were proven on the D-18T and D-27 engines). The engine is provided with a compact high-efficiency cascade-type thrust reverser.

A FADEC-type automatic control and monitoring system is at present under development for all modified bypass turbofan engine versions of the D-436 family.



AI-222-25UVT turbofan structural design



AI-222-28 turbofan structural design

AI-450TP turboprop engine for light general aviation aircraft

Development of a small-sized gas-turbine aero-engine intended for light general aviation (LGA) aircraft is seen as an urgent task by the domestic aviation industry, as there are about 350,000 such aircraft operated worldwide. In the 1990s many aircraft manufacturers in the CIS countries started developing LGA aircraft (about 100 projects) to meet growing interest to them in the domestic market and to promote them to the international market. It called upon development of corresponding power plants.

The overwhelming majority of air propulsion units in the 110-400-hp category make use of propeller motors, in view of the fact that efficient gas turbine engines of such power rating are hardly feasible. Whereas at the 400-600-hp required power ratings turboprop engines can compete successfully with propeller motors thanks to their better weight-to-thrust ratio, greater service life, and less expensive fuel.

One of the reasons for development was the requirement to replace two propeller motors (210 hp) with one gas turbine engine (400-500 hp) in the Be-103 amphibian's propulsion plant.

The AI-450TP turboprop engine has the same turbocompressor section as the AI-450 turboprop engine which is now being developed at the Ivchenko-Progress SE. The AI-450 is a baseline engine for a family of turboprop and turboshaft engines rated at 400-1,000 hp.

The AI-450TP engine's design engineering project was supposed to follow the below basic guidelines:

- To provide high level of engine's tactical-technical, operating and economic characteristics

Engines main data

Engine Parameters	D-436-148	D-436T1	D-436T2	D-436T3	D-436TP
Takeoff, SLS M 0					
R, kgf	6,400	7,500	8,200	9,400	12,000
CR, kg/kgf*h	0.36	0.366	0.371	0.396	0.275
$G_{B\Sigma}$, kg/s	237.9	261.0	272.5	284.2	556.8
m	4.77	4.89	4.88	4.21	10.35
$\pi_{K\Sigma}$	19.93	22.85	24.35	29.27	26.2
$T^*_{\text{gas rotor wheel}}$ max, K	1,450	1,530	1,590	1,590	1,590
Maximum cruise					
H, m	11,000	11,000	11,000	11,000	11,000
Mach number	0.75	0.75	0.75	0.75	0.8
R, kgf	1,500	1,450	1,550	1,820	2,400
CR, kg/kgf*h	0.62	0.643	0.633	0.631	0.555
Dimensions/weight					
D_{inlet}, mm	1,390	1,390	1,390	1,390	2,070
M_{dry}, kg	1,400	1,450	1,450	1,600	2,230
g, kg/kgf	0.193	0.193	0.177	0.170	0.186

- To cut time and cost of engine's design, development and certification
- To cut time of transition to engine's series production.

The AI-450TP features a modern layout with a single centrifugal high-pressure compressor stage, a single-stage compressor turbine and a free single-stage turbine. Such design has a potential to improve engine weight and reliability parameters, and to cut its manufacturing cost.

The AI-450TP engine structure incorporates latest design achievements:

- single-shaft core with the centrifugal compressor
- high-speed compressor turbine and free turbine
- cooled compressor turbine
- electro-hydromechanic engine control system (FADEC-type system is optional)
- built-in test and monitoring system (on-condition maintenance is provided)
- modular design (engine assembling and overhaul are simplified).

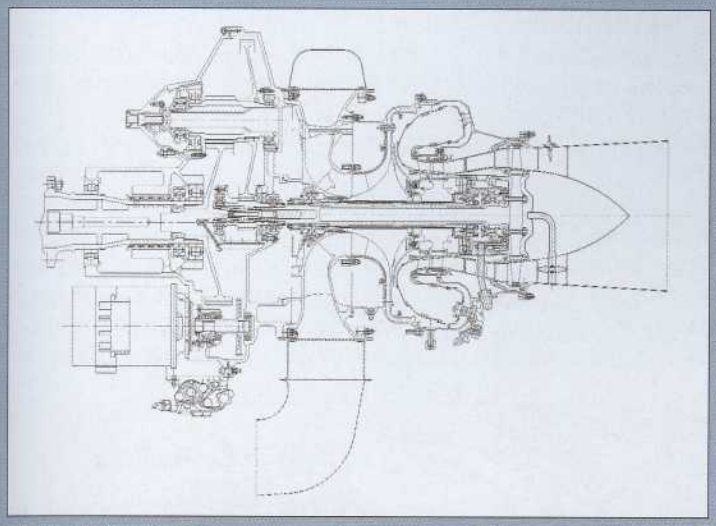
The AI-450TP engine distinguishing features are as follows:

- Low specific fuel consumption
- Long service life
- High reliability
- Low noise level
- Low contaminating emissions.

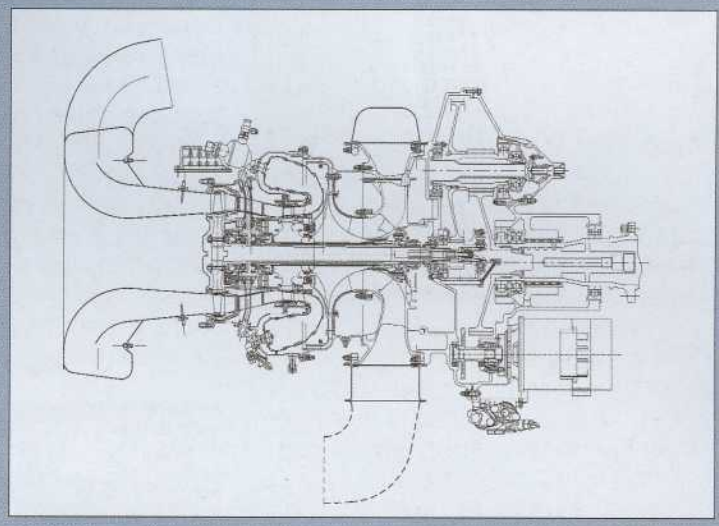
The AI-450TP engine is equipped with an automatic starting system comprising elements of electrical, electronic and fuel systems.

The engine is manufactured in the all-climatic configuration adapted to operation in geographical regions listed in the general macroclimatic group (B, U) with all microclimates but arctic cold.

Ka-226 helicopter



AI-450TP - Pusher



AI-450TP - Tractor

AI-450 engine development prospects

The AI-450TP turboprop engine is augmented by 12.8% with relation to the basic engine, and its structure allows development of other increased power versions (by 20-25% compared to the AI-450 turboshaft engine) without much redesign. The engine power can further be augmented by developing its versions with one or two axial compressor stages installed on the core shaft before the centrifugal stage, providing more efficient cooling for the turbine, modifying engine's design, reinforcing power transmission elements (shafts, gears, bearing supports), replacing some materials.

Preliminary studies of the mentioned engine versions confirm feasibility of engines with 660-hp/ 800-hp/ 1000-hp shaft power ratings. At the same time aircraft turboshaft and turboprop engines with forward and backward shaft outputs, as well as ground-based power units rated at 250-650 kW can be developed.

For a free turbine with backward shaft layout it is possible to develop two-spool core engines with a low-pressure compressor featuring three axial stages or a single centrifugal stage providing the free turbine shaft power output of 1,270 hp and 1,150 hp accordingly.

Thus, it may be concluded that a family of gas turbine engines of various configurations can be derived from the AI-450 engine core with their available power ratings covering a wide range for aviation and industrial applications.

AI-450TP turboprop engine operating parameters in main flight modes:	
Take off / M=0, H=0, ISA	
Min air propeller shaft power, hp	500
Max equivalent specific fuel consumption, kg/ehp*h	0.250
Maximum cruise/ M=0.2, H=1,500 m, ISA	
Min air propeller shaft power, hp	280
Max equivalent specific fuel consumption, kg/ehp*h	0.296
Service life, h (cycles):	
Full assigned	12,000 (4,800)
Operational	6,000 (2,400)
Starting system	electrical
Operating conditions:	
Flight altitude envelope, m	0 – 8,000
Flight speed envelope, km/h	0 – 600
Max dry weight (as per GOST 17106-90), kg	123
Dimensions (length*width*height), mm	1,038*700*648

The engine consists of the three modules:

- Engine core comprising inlet section, compressor, combustion chamber and compressor turbine
- Reduction gear with accessory gearbox in the same casing
- Free power turbine with its independent shaft and exhaust pipe.

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ENGINES ...
FOR PERFECT VEHICLES

Vyacheslav BOGUSLAYEV,
Chairman of the Board,
Director General of the Motor Sich JSC,
Doctor of Science (Engineering), professor

Nowadays the world aviation community knows the glorious name of "Motor Sich". It is a centre of the aero-engine manufacturing industry of Ukraine amid lands of a legendary Khortitsa, the cradle of the Zaporozhye Cossacks' State on the bank of the old Dnieper.

With its history dating back as far as 1907, today's Motor Sich stands out as one of the world's largest producer of modern reliable aero-engines capable of competing with most advanced products of the world's leading aero-engine companies. The enterprise also provides engine testing and operational support services. Motor Sich's engines prove high quality and reliability by their successful operation in over 100 countries worldwide.

One of the latest priorities of the Motor Sich JSC is concerned with launching into production of a family of the D-436T1/TP turbojet engines designed for 100-150-seat short-haul aircraft: they are, first of all, the Tu-334 airliner and the world's unique Be-220 multipurpose amphibian aircraft. The D-436T1/TP engines have low life cycle cost and comply with both existing and future international norms regarding noise and emission levels.

The D-436-148 engine is a new modification of the D-436 embodying latest design inventions. It is destined for the An-148 regional and long-range (up to 7,000 km) airliners. Engine's control system is adjusted to the aircraft version (short-haul or long-range) to provide takeoff thrust ratings in the range from 6,400 to 6,830 kgf, optimise its performance in all flight modes, increase reliability, and reduce fuel consumption and maintenance costs. The D-436-148 is seen today as the most perfect engine of its class in the CIS countries meeting latest requirements of the ICAO and the Eurocontrol. The engine is developed in accordance with the interstate agreement between Ukraine and the Russian Federation within the framework of cooperation of the four enterprises: Ivchenko-Progress SE, Motor Sich JSC, Salyut FSUE (Moscow, Russia) and UMPO JSC (Ufa, Russia).

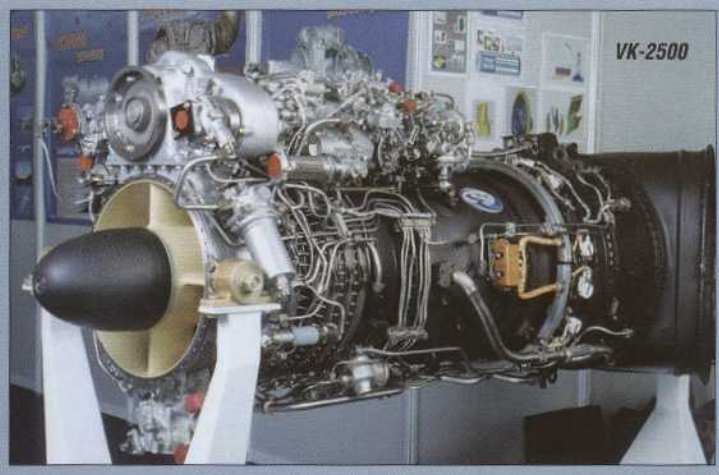
The AI-450MS auxiliary engine is our in-house design intended for the An-148 and other aircraft of various purposes. It helps to reduce cruising engines operating time, enhance aircraft operational safety, and cut expenses on auxiliary ground equipment and maintenance personnel.

The An-148 aircraft powered by the D-436-148 and AI-450MS engines performed its maiden flight in December 2004.

The Motor Sich JSC continues a joint project worth mentioning on creating the 2,500-kgf AI-222-25 engine for the Yak-130 combat trainer in cooperation with the Ivchenko-Progress SE and the Salyut FSUE (Moscow, Russia). By coupling its advanced aerodynamics with the AI-222-25's superior performance the Yak-130 aircraft can display manoeuvrability characteristics equal to the 4th/5th-generation fighters. Thanks to its advanced re-programmable fly-by-wire control system, the trainer is a flying class for preparing pilots of advanced combat aircraft, such as Su-30, MiG-29, F-15, F-16, F-22, Mirage-family fighters, Harrier, Eurofighter, and others. We hope that military professionals will choose the Yak-130 combat trainer powered by the AI-222-25 engine for their air forces.

Specialists would undoubtedly show interest in the D-27 world's only turbopropfan with 14,000 hp takeoff thrust and low fuel consumption (lower by 25-30% than that of any contemporary bypass turbofan) mounted on the An-70T military transport STOL aircraft. This unique air-

D-436T1


VK-2500

craft has no alternative in the world, neither now nor in the next decade of years. High performance of the aircraft has won universal recognition, and many countries expressed their intention to procure it.

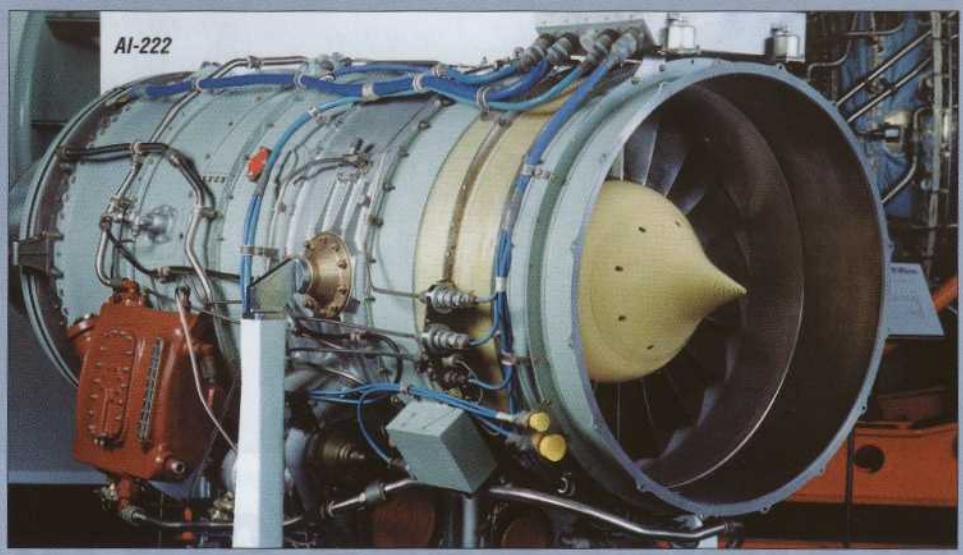
Special place in the Zaporozhye aero-engines exposition, and production development plans, is given to helicopters.

The Motor Sich JSC is developing together with the Ivchenko-Progress SE the AI-450 new-generation small-sized turboshaft engine with a 450-600-hp takeoff power rating. The engine can be mounted on the Ka-226 and Ansat helicopters, as well as on the vintage Mi-2s. The AI-450 corresponds to modern specifications, while its digital electronic control system provides built-in testing, trouble-shooting and indication, and operational time registration. A turboprop modification of this engine can be mounted on light aircraft of Yak-58 and Be-103 type, trainers of Yak-152 and Su-49 type, and unmanned aerial vehicles. The first samples of the engine are passing now through bench testing. So it can be justly said that expectations for the emergence of an outstanding long-life engine with low operational cost are answered.

The Motor Sich JSC has opened a new line of business connected with the preparation to manufacturing of the Ka-226 helicopter with two AI-450 engines, designed for transportation of 6-8 passengers or up to 1.4-tonne payload. According to expert estimates, the helicopter retrofitted with the AI-450s, instead of the US Allison 250-C20B engines mounted at present, would cost approximately 20% less which would expand its market niche and raise competitiveness.

The VK-2500 and VK-1500 engines have come out as a result of the fruitful cooperation of the Motor Sich JSC and the Klimov Plant FSUE.

The certificated VK-2500 engine with 1,764 kWt (2,400 hp) takeoff thrust and 1985 kWt (2,700 hp) emergency thrust ratings is designed for new modifications of Russian Kamov and Mil-type helicopters. Fuel efficiency and weight parameters put it among the world's best samples of aero-engines. The VK-2500 engine improves helicopters' operations in remote hot-climate regions, their speed, ceiling and payload capacity, as well as manoeuvrability.


AI-222

Currently the company works on designing the TV3-117V Series 02 helicopter engine with even higher flight and operational characteristics and lower life cycle cost. It will be fully interchangeable with the TV3-117 family engines and can be mounted on all helicopters of the previous makes during their re-motorization.

The VK-1500 family engines are fitted with a new electro-hydromechanical engine control and monitoring system to optimise its operational characteristics. The engine versions are employed in wide operational areas: the VK-1500C is designed for powering short-haul (An-3, An-38) and new-generation regional aircraft (Be-132MK); the VK-1500VM is intended for the Mi-8 helicopters of previous makes; the VK-1500VK – for the Ka-60 and Ka-62 helicopters.

All above-mentioned engines are distinguished with such merits, as high reliability and efficiency, low specific fuel consumption, simple maintenance, highly efficient testing and monitoring systems, low price and operating costs.

The Motor Sich JSC has introduced the quality control system meeting requirements of ISO 9001:2000 international standard as regards aero-engine manufacturing, repairing and servicing, which is certificated by the BVQI international company.

Basic quality of the production is warranted by high level of design work, modern technological base, and streamlined labour management.

The Motor Sich JSC traditionally ensures for its customers:

High quality of its products

- Observance of most strict ecological standards
- Global guarantee and post-guarantee servicing
- Convenient payment/settlement schemes.

Once you have decided to procure aircraft and helicopters powered by engines of Motor Sich's making, you will get competitive air platforms meeting the most stringent requirements to flight and operational characteristics.

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FLYING GREEN COLOURS

After having taken over a mass of small flight operations gone bankrupt, the Siberia air company has won reputation of a business sanitation agent becoming one of three top national air carriers during the last seven years. Such rapid growth of the Filyovs family's air transport empire had some negative repercussions for the company whose inflated proportions called for more complex management structure. The Siberia's leadership intends to cure the growth malady with re-structuring and re-branding medicines.

At the opening ceremony of the Siberia's business room in the Domodedovo airport Vladislav Filyov, director general of the airline, explained his motive for re-branding with an unexpected cinema allusion. "You may remember a movie "Crocodile Dandy in New York" in which a hero from an Australian outlandish province comes to New York City. He greets everyone he meets in the streets just like he did in his own village where all people know each other and greet each other in their tradition. But New York with its huge flow of people perplexes and disorients him. In fact, scientists have long proven that any person, be he or she a country or megalopolis dweller, experiences social contact shock. So the main objective of transformations we have started in our airline is to reduce this kind of shock for our passengers", - concluded Mr. Filyov. It is rumoured that this psychotherapeutic note to re-branding was authored by Natalya Filyova, the wife of the director general and deputy director general. Vladislav Filyov, a retired serviceman, who presented to journalists the new corporate image, is better known in the market as a corporate raider - specialist in takeovers. However, role division between the director general and his deputy must be sought for with a good deal of care as there is no absolute leader in this managerial tandem where one complements another.

Initial Expansion

The re-branding campaign of the Siberia airline pursues at least one more objective besides a psychological therapy for passengers. "We want to single out our company from a mass of other airlines. In modern Russian market there is the Aeroflot, and then goes all the rest. We want to make Siberia a unique company", - says Natalya Filyova. In 1992, when the company entered the market, nobody thought of uniqueness. Like many other airlines, the Siberia was formed on a fragment of the then Aeroflot – the Tolmachevsk joint air group of Novosibirsk. Since the mid-1990s the air carrier grew bigger by acquiring neighbouring regional air operators with poor financial statuses. The company took over air operations in Barnaul, Tomsk, Kemerovo and Irkutsk, settling their debts. Since Siberia's owners kept in the shade at that time, it is not officially known even today who was the principal shareholder till 1998 (some reports suggest that the company belonged to Tatevos Surinov's Rosaviaconsortium). Despite its expansion into regions, the Siberia remained a mediocre air carrier bringing to its owners nothing but losses. In the late 1990s it was plagued by multi-month delays in salary payments to its personnel.

Vladislav Filyov started as a member of the Board of directors when he entered Siberia air company in 1997. In March 1998 he became its director general. Being a retired officer, he never dealt with aviation business before, and had to pass a professional training course and obtain the certificate authorizing his work at positions concerned with flight safety. Luckily, prior to

joining the Siberia air carrier, Filyov worked as top manager at several enterprises: a deputy director general on economics of the Metallist Plant, and a deputy director general on business development and planning of the Boguchan-GES-stroy enterprise. At that period the Siberia AC needed not so much an aviator but a manager capable of restructuring the airline and boosting its sales and market share. In autumn 1998 Siberia's owners made an offer to Filyov to buy out the company's control stake as "they had interests other than the air company". According to Filyov, the control stake cost then a ridiculous sum of three million roubles. It must be said that the corporate management was reluctant to announce publicly the purchase at that time (market players knew, however, that the control stake belonged to Filyovs).

It was acquisition of the Vnukovo Air Lines (VAL) that allowed the Siberia AC to become a big fish in the market abandoning ranks of middle-sized airlines. The VAL company, one of the three air transportation market leaders in the mid-1990s, stood at that moment on the brink of bankruptcy driven there by its own top management, in spite of the largest domestic flight-route network inherited from the Soviet-era Aeroflot. The Siberia's management had attempted to acquire VAL's assets in 1999 - and Vladislav Filyov was even its director general for some time. The merger deal could not be finalised then, and the major part of the acquisition happened later in 2000 – 2002.

The Siberia air carrier undertook to pay off the VAL's debts amounting to one billion roubles, and obtained in return its flight-route network and airliners fleet. The most valuable part of the acquisition was evidently the flight-route network that allowed the Siberia to become domestic air operator Number One.

It took nearly two years to complete the VAL's acquisition as its creditors thwarted all attempts of assets transfer in fear that they may be left to exact their debts from a non-solvent company. The Siberia company had to spend its operational profits to pay off the VAL debts. Thus, last year the Siberia's management refused to pay dividends to state shareholders quoting losses incurred, in particular, by the protracted reimbursement of the Vnukovo Air Lines' debts.

Having the VAL company not yet fully acquired, the Siberia air carrier announced its merger with Aeroflot. The latter confirmed its talks with Filyovs, but the announced merger was never realized, nor attempted after that – the idea of it seems to have been dropped by the management of the two companies.

Forced to develop its operations independently without participation of the biggest national air carrier, the Siberia had to solve problems of its own fleet renovation and expansion to cover the expanded flight-route network. In 2000 Filyovs got a credit of $15.8 mln in the Sberbank for purchasing one Tu-204 aircraft. The credit terms were assessed by the director general as "tough, even draconian, but practicable": the Siberia mortgaged 50% plus 10 corporate shares, one new airliner and two aircraft engines for 4.5 years.

Market analysts consider the acquisition by the Siberia of the Armenian airline – Armavia, as a means for purchasing additional aircraft. Filyovs acquired 70% of the Armavia shares in 2002 but the amount of this transaction was not disclosed and the Siberia management refused the very fact of the acquisition: the Armavia airline belonged formally to two Armenian shareholders. With the advent of the Siberia company the Armenian carrier was able to lease two A-320 airbuses. According to the apocryphal story the air carrier from Novosibirsk was compelled to buy out the Armenian company. It is said to have concluded by that time a leasing contract on the above aircraft that was barred from importing

them because of Russia's forbidding customs duties. Unlike Aeroflot and Transaero air lines the Novosibirsk company had no aircraft import preferences (it is only in the last six months that the company has been able to lease three A-310 airbuses). There has never been an official rationale for the acquisition of the Armenian company, although the Siberia is reported to have sold it some weeks ago.

An example of yet another not very successful fleet augmentation is Siberia's attempt to procure 12 Il-62 aircraft of the Domodedovo Air Lines (DAL) company. The airliners were alienated from the DAL in 2002-2003, in favour of several Cypriote offshore companies. The DAL transferred these aircraft to clear off the bills of exchange issued earlier in payment for services of the Domodedovo airport, but the carrier's shareholders, the Sigma Consulting Company and Russian State, judged the aircraft alienation illegal. As a result, the Siberia's deal never materialised.

Always trying to augment their airliners fleet, Filyovs never lost opportunities of expanding the flight-route network inherited from the Vnukovo Air Lines. The Siberia air carrier decided to move its operations into the economically important region of Southern Urals by acquiring 54% of the Chelyabinsk Air Enterprise (CAE) shares. Vladislav Filyov then revealed that the CAE's acquisition was an infrastructure-building project to create an air company with the flight-route network covering the entire territory of Russia.

Sergei Solntsev, the CAE's new director general elected at the stockholders' meeting in June 2004, could take up his duties but several weeks later in view of the protests by Evgeny Razumov, a minority stockholder of that enterprise. Prior to the Siberia's advent, Razumov controlled the enterprise together with his partner Sergei Yashin who managed to consolidate a 54% stock package behind Razumov's back and sell it to the Siberia AC. In his turn Razumov declared the transaction invalid since it had not been approved by antimonopoly agencies and the shareholders had been deprived of their right to preferential purchase of the stock. the Siberia's management could settle the dispute amiably with the businessman by last summer issuing in late August an official statement on absence of mutual claims. Yet company's problems with Chelyabinsk continued as one of the regional air carriers complained to the local department of the Federal Antimonopoly Service that the

Siberia air line changed fixed tariffs set for its flights. The Federal Antimonopoly Service demanded explanations and, failing to obtain such, accused the Siberia air carrier of violating Article "On competition" bringing a suit against it.

Another target for attacks against the Siberia airline company by Chelyabinsk businesses is a local airport of Balandino. The airport is acquired together with the Chelyabinsk Air Enterprise as its integral part. The airline company from Novosibirsk is accused of unwillingness to invest into restructuring of the Balandino airport. Valery Panov, the head of the local PromAss industrial association and, simultaneously, deputy to the State Duma (Russian Parliament), openly threatened the company with the ultimatum: "Either the Siberia solves problems of the Chelyabinsk airport or we shall find means of thwarting its business in the Urals region". The Siberia pledges that certain financial investments have already been made: for instance, the company has rebuilt the airport's runway so that it can process Boeing 737 class aircraft. The air carrier is considering options of hiring a managing company for the airport and selling it in future.

Siberian Diet

Unfortunately, corporate accounts do not allow us to determine with certainty what major finance sources were used for the Siberia's regional expansion and fleet modernisation. It should be noted that competitors accuse Filyov of abusing credits taken on the security of shares and aircraft. But the Siberia's director general is quite optimistic in assessing his company's credit positions. He maintains that with the $370-mln turnover in 2003 its corporate debt has reached only $120 mln (32%) which is quite acceptable for normal operations and business development (in comparison, Aeroflot had this index at 33% for the same period). Notwithstanding a relatively stable financial situation of the company, it is quite obviously short of development funds. Otherwise, the Siberia air carrier would hardly have bothered to launch a full-scale campaign on cost reduction. With this purpose the company plans its restructuring in the nearest two years: some departments shall be discarded with their functions given away for outsourcing, others shall be taken out of the company and made into subsidiaries with the 100% Siberia's ownership. Sales department, as well as technical, tourist and IT divisions, are slated for affiliation.

The subsidiaries are expected to render services not only to the Siberia airline but to other air carriers as well. According to the Siberia's press secretary Ilya Novokhatsky, its technical division – Sibir Tekhnik, already a separate legal entity, must be servicing other air carriers in future. One of the key objectives of the restructuring is to reduce staff of the company. The leadership of the Siberia airline company plans to lay off 1,000 persons from 5,300 staff working today.

Besides the need to invest into business development, the carrier was driven to drastic actions against expenses by spiralling aviation kerosene prices. Last year the Siberia air carrier planned to have a $30-mln profit (for the whole period of its operations the company never had any net profits). In the meantime the management reveals that the results of the first three quarters of 2004 show losses of 800 mln roubles. So drastic a shift in the forecast is explained both by the need to allocate sums, written down to the VAL's old debts, to losses, and by a 50-60% increase in fuel prices.

Economic considerations also prompted the Siberia to be the first Russian airline to

introduce Internet air ticket booking for its flights. Preliminary studies show that this measure can reduce markedly commission fees paid to ticket selling agents, which normally vary from 6% to 12% of the total ticket price. Ticket booking via Internet is now offered only for a limited number of flights, but by September this service is to be available on all routes. To encourage Internet bookings, the Siberia has changed its summer tariff system to simplify ticket cost calculations made by customers themselves. In particular, time limits on passenger stay in destination points are lifted, regulations for ticket return and rebooking simplified, and fines for rebooking standardised (earlier their values depended on ticket price). Rival airlines withhold their comments on the Siberia's latest initiatives and their expected efficiency: no major air carrier has come yet to adopt similar tariff revisions.

Despite their policy to reduce corporate expenses and staff, the Siberia's leadership never cease to invest into corporate brand development, perhaps understanding that Siberia's market share cannot be further increased without making a qualitative leap. Although the amount of investments into re-branding is not made public, only aircraft repainting cost is estimated at $1.5 mln. The new bright green colour of the Siberia's aircraft has provoked a wave of confusing opinions in the market and some sick jokes in aviation community. Neither has the air company disclosed a new interior designed for its airliners: it is known at the moment to be as unique as their exterior paint. The Siberia airline is known to have ordered a mosaic carpeting for passenger cabin floors, a design refinement never before practiced by any airline. The new aircraft look is not the most expensive share of the re-branding cost compared with the personnel re-training programme which is much more expensive. "Inventing new logo is one thing, whereas making it work by changing mindsets of company's personnel and clients is a totally different story. It costs different money as it takes much more time and calls for efforts of different quality", - says Ilya Slutsky, president of the Media Arts Group.

Name Targeting

Simultaneously with the re-branding, the Siberia air carrier plans to adjust its market strategy. Natalya Filyova emphasizes that the carrier should focus on regional routes in the coming years. Until now Moscow-to-region flights have been traditionally in high demand on the market, provoking not infrequent fights between air carriers for these routes. Prior to starting the 2004/2005 winter flight programme the Siberia airline stated publicly that the Kazan airport administration attempted to disrupt its flight scheduled from Kazan to Moscow. The company had difficulty in obtaining arrival and departure times for its flights in the airport timetable, and later on it suffered from delays caused by the airport. At that time the Siberia's representatives maintained that the airport favoured the Tatarstan airline servicing the same Kazan-Moscow route.

Whereas interregional flights were less popular with air carriers in the past, they begin fighting for these routes now. The Siberia tries to secure for itself Norilsk-Krasnoyarsk route. The Filyovs company has been invited to this route by Norilsk's Mayor Valery Melnikov who believes that the route is monopolized by the Krasnoyarsk air carrier – KrasAir. It is clear that authorities of Krasnoyarsk and the local air carrier are opposed to the competitor from Novosibirsk. The outcome of this conflict remains yet to be seen. It must be noted that emphasis on regional flights may be rather risky tactics. The Siberia's managers figure that interregional flights will soon become more popular and profitable following air traffic growth witnessed in several last years. But this trend can be turned down by the fuel prices growth.

Even considering the fuel cost burden, the Siberia air company has no other choice but to expand into regions, as the international air traffic market is regulated by inter-governmental agreements and dominated by the state-owned Aeroflot licensed for the major part of lucrative foreign flights. Private air companies would hardly be able to compete with the national carrier in the immediate future. Although it does not mean that they have no such plans in principle. For example, intention to challenge some day Aeroflot in international routes may be signalled by the above-mentioned Siberia's re-branding with plans to change company's international name. Its top managers have decided to abandon the "Siberia" name and put two names instead – Sibir and S7 (its international company code assigned by the International Air Carrier Association). "The name of S7 seems to me a compromise rather than a coordinated choice. The international company code can hardly correspond to the new brand concept", - notes Oleg Beriev, president of the Mildberry Company. Siberia's desire to switch from the Cyrillic to Latin alphabet and abandon in some part the Russian name betrays plans to consolidate its position in foreign as well as domestic air transportation markets. Market operators say that sometimes foreign passengers get confused by the very word "Siberia" since many of them associate this geographical name with labour camps and penal servitude. So foreigners must be target audience for the change-over to S7 since Russian passengers were never embarrassed with the name of Siberia.

Polina ZVEREVA,
Company Magazine

The Siberia is the second biggest airline company in Russia. In 2004 it totalled 29,780 flights with 3.7 mln passengers (64.8% of them flown on domestic routes and 35.2% - in international flights) and almost 23,000 tonnes of air cargoes. The company holds the first place in the domestic air traffic sector with its share estimated between 11.6% to 13%. Although the 2004 financial statement is not yet published, it is known that the company finished 2003 with about $370-mln income and $1-mln net profit. The corporate assets are distributed as follows: 56.8% of shares are owned by the first deputy director general Natalya Filyova, wife of the director general of the air company – Vladislav Filyov, 25.5% belong to the Russian state, and the remaining part is divided between minority shareholders.

RUSSIAN AIR TRAFFIC UPGROWING IN 2004

The 2004 air traffic official statistics have not been published yet because of the ongoing reorganisation of Russian aviation administration. However, even fragmented information, if properly gathered and analysed, can help to arrive at some edifying conclusions.

After summing up last year's results one can see that Russian airlines' passenger and cargo traffic has been growing steadily since 2001. According to data revealed to public at the RosAviaExpo 2005 exhibition, the passenger traffic in 2004 was as great as 33.78 mln persons, exceeding by 14.8% the 2003 total. Cargo and postal shipping has also increased by 5.5% reaching 654.8 thousand tonnes. Passenger turnover has increased by 16.6%, and cargo turnover by 9.8% surpassing 10 billion tonnes per kilometre.

The leading air carriers are Aeroflot - Russian Air Lines (6.59 mln passengers), Sibir Air Company (3.747 mln passengers), and Pulkovo federal state unitary aviation enterprise (2.7 mln passeangers). Even though the tendency for air traffic growth prevails, there are still unprofitable air transport enterprises in Russia.

An average age of the civilian aircraft fleet in the Russian Federation differs little from that in the USA. Russian air companies continue to renew their aircraft trying to improve overall economic and ecological indices.

Alexander Neryadko, head of the Federal Air Transport Control Service, stated that in 2004 Russian air carriers bought 15 used foreign-origin aircraft with various service life (two Boeing 747s, nine Boeing 757s, four Boeing 767s) and only four new Russian-made airliners (three Il-96s and one Tu-204).

Russia's civilian airplane fleet decreased in 2004 by almost 5% to 5,702 aircraft. Reference materials prepared to the board meeting of the Federal Air Transport Control Service show that at present there are 1,404 long-haul passenger planes in operation in the Russian Federation. The number of foreign-made airliners has grown from 69 to 82, including two Boeing 747 cargo planes procured by Volga-Dnepr air company. Aeroflot is flying 31 foreign-origin airliners. Only 34 indigenous aircraft of the new generation, such as Il-96, Tu-204 and Tu-214, are in operation with Russian air companies. A wide-scale renewal of air fleets with Russian-made aircraft so much anticipated last year never materialised.

Russian civil aviation is still plagued by a great number of unresolved problems concerning new aircraft acquisition, aircraft repairs and overhaul, delivery of conditioned spare parts, aircraft basing conditions in various airports and their statuses, improvement of air traffic control, and, finally, attraction of passengers.

Air carrier ratings in 2004 remained the same: No.1 is always Aeroflot - Russian Airlines. Then come the next three – Sibir, Pulkovo and KrasAir, thanks mainly to their large air fleets.

Sibir Airline was awarded with one prestigious international prize of the Aviation Transport

World under the nomination "Market Leader" and another one "for successful employment of instruments of mergers, acquisitions and partnerships enabling it to become the largest Russian carrier on domestic routes and second operator by the total air traffic volume".

When analysing the air traffic volume growth, one will notice that it is Transaero airline that became the unquestionable leader in 2004 with its passenger traffic increased by 56% and cargo traffic by 57% compared to 2003. So it was a small wonder when the company was awarded with the national prize "Company of the Year 2004" in the nomination "Transport" and a special prize "For Permanent Progress".

According to preliminary data on passenger traffic volume, KrasAir airline was in the second place with its 36.7% share of it, and Ural Airlines was the third with 18.33%. Our leading national carrier Aeroflot – Russian Airlines had this index at just 17.4%.

Passenger load factor increased together with the passenger traffic growth. It was up by 6.5% for Sibir airline, and 5.6% for Utair. Passenger load factor increase was negligible for our leading national airlines Aeroflot – Russian Airlines and KrasAir: 2.6% and 1.9% respectively. But its average value was 70.7%, practically equalling that of 2003. The commercial load factor of 60.8% has also remained virtually unchanged.

As to cargo shipping growth, Aeroflot – Russian Airlines comes second in this classification, with Ural Airlines following. But not all carriers increased their cargo turnovers. Dalavia, for example, had a decrease of 2.5% for some serious reason.

The Interstate Aviation Council of the Commonwealth of Independent States reported that in 2004 there were 50 persons killed in 17 flight accidents, including 6 crashes, in the Russian Federation. It did not take into account air disasters of 24 August 2004 when 90 persons perished as a result of terrorist acts on board the Tu-134 and Tu-154 airliners.

It is quite obvious that Russian airlines are constantly developing, and they need an all-out state support of their operations.

Works were continued on implementation of the federal target programme "Modernisation of Russia's transport infrastructure in 2002 – 2010" as regards its "Civil Aviation" Chapter. Some 1,813.25 mln roubles of state capital investment funds were spent last year on projects carried out within the framework of the above programme. In 2004 other finance sources were also attracted for investing into construction and restructuring of civil aviation installations: 2,527.5 mln roubles were spent, including 1,175.9 mln roubles from extra-budgetary funds and 175.7 mln roubles from federal subjects' budgets.

As a result, the following works were accomplished: putting into operation of the lighting systems in Yakutsk, Bolshoye Savino (Perm) and Koltsovo (Yekaterinburg) airports; reconstruction of the lighting system in Baratayevsk (Ulyanovsk) airport; reinforcement of the stopway end strip at Irkutsk airport; paving of the runway in Khabarovsk airport; completion of the runway reconstruction in Krasnoyarsk airport. A new airport complex was built in Kyzyl airport providing a handling capacity of 250 passengers per hour.

Nikolai YAKUBOVICH

Passenger airliner fleet data

Quantities given for dates	01.01.2002	01.01.2003	01.01.2004	01.01.2005
A/C type				
Russian-origin aircraft				
Il-18	27	19	-	12
Il-62	76	69	73	70
Il-86	73	73	73	66
Il-96-300	10	10	11	14
Tu-154	353	347	352	360
Tu-204	14	13	13	14
Tu-214	1	3	5	6
Yak-42	81	81	89	95
An-24	264	250	224	214
An-38	4	6	6	6
Il-114	-	2	2	2
Tu-134	235	238	242	238
Yak-40	326	314	298	284
An-74	24	32	31	31
An-124	20	20	23	25
Il-76	179	181	168	
Foreign-origin aircraft				
A-310	11	11	8	4
A-319	-	-	5	8
A-320	-	-	5	7
A-321	-	-	-	3
B-737	18	18	16	11
B-747	-	-	-	2
B-757	-	-	-	11
B-767	6	6	11	15
B-777	2	2	2	2
DC-10-40F	-	2	4	4
Falcon	6	6	7	6
BAe-125-800	4	4	4	4
Cessna	1	1	1	1
Gulfstream	1	1	1	1
Dash-8-100	-	-	3	3

There are 82 foreign-made aircraft listed altogether in the Airplane Register of the Russian Federation

Flight accident statistics for aircraft operated by Russian air carriers

2000	2001	2002	2003	2004	
Flight accidents					
(including crashes)	17	28	21	9	17
Crashes	5	10	7	2	6
Dead in crashes	20	218	131	29	50

PANTSIR-S1

VERSATILE CLOSE-RANGE AIR DEFENCE GUN-MISSILE SYSTEM

In modern warfare air attack assets can perform strategic missions autonomously, sometimes deciding the war outcome before land forces are engaged into action.

This is why the mission of object air defence has been and still is of great importance.

The combat organization emphasis has currently shifted giving highest priority to struggle against high-precision weapons (HPW).

The HPW arsenal exceeds carrier fleet capacity by several dozens of times: HPWs have low signatures and can be fired in salvoes within a wide range of altitudes and flight speeds.

Medium- and long-range air defence systems are not capable of countering a large number of HPWs due to technical restrictions (rough terrain, very low flight altitudes) and economic considerations (high cost of such air defence weapon systems).

All the above considerably extends the class of aerial targets to be engaged by short-range air defence weapon systems.

Thus, the weapon system must be versatile, capable of defeating any target in its engagement zone.

What is our perception of such weapon system?

The system must feature:

- Integrated missile-gun armament providing continuous engagement zone (up to 20 km in range, up to 10 km in altitude)
- Small-sized surface-to-air missile with high flight (max air speed – 1,300 m/s) and ballistic characteristics (enhanced-power high-explosive fragmentation rod warhead weighing 20 kg with the sustainer section weight – 30 kg), and low cost
- Command guidance system for surface-to-air missiles making it possible to develop an agile, small-sized highly-effective missile.

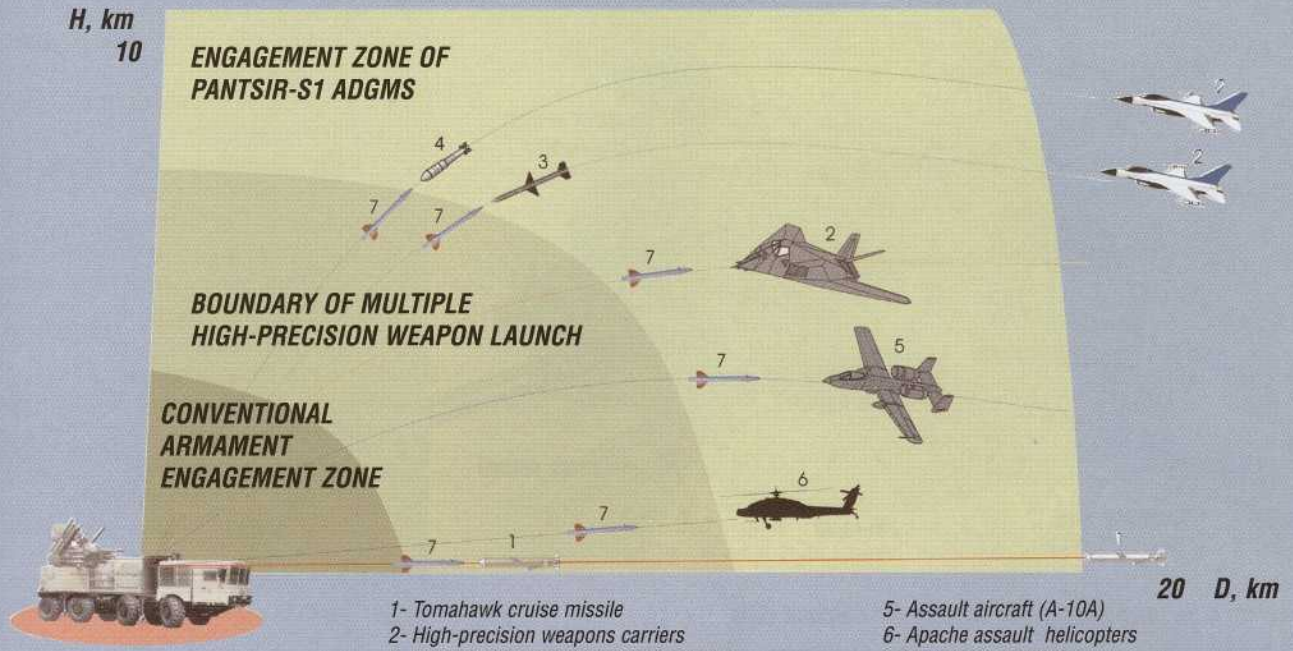
The system must possess:

- Target engagement versatility, that is to be capable of engaging a wide range of aerial targets, such as aircraft and helicopters before they deliver their onboard weapons, small-sized guided missiles, as well as light armoured vehicles, manpower, and other ground targets
- Superior jamming immunity attained via a common multi-mode and multi-spectral radar/optical control system operating in decimeter, centimeter, millimeter and IR wavelength bands
- Combat autonomy due to accommodation of target detection, tracking and engagement assets in a single combat vehicle
- Passive mode of operation and supreme guidance accuracy in the optical mode due to employment of the IR channel with logic signal processor and automatic target tracker
- Fully automatic firing mode of a separate combat vehicle operating either independently or within a group of combat vehicles enabling its crew to improve time characteristics and relieve psychophysiological strain
- High target engagement capability due to short reaction time, high missile speed and availability of two independent guidance channels operating in a wide sector (90◦90 o in azimuth and elevation).
- On-the-move fire capability providing both gun and missile employment owing to high-precision stabilization and guidance system
- Modular design concept enabling to mount the weapon system on various types of chassis (wheeled or tracked) and platforms (sheltered version) in different configurations.

The Pantsir-S1 air defence gun-missile system (ADGMS) incorporates the 57E6-E missile featuring:

- short flight time in the booster phase (t≈1,5 s, V_{max}=1,300 m/s)
- high manouevrability after the booster motor jettison (max N=32)
- minor ballistic deceleration during the post-booster flight (40 m/s for 1 km en route)

Pantsir-S1 ADGMS basic characteristics	
Armament	missile/gun
Ammunition load:	
Missiles on launchers	12
Artillery rounds	1,400 pcs
Aircraft detection range	2-36 km
Aircraft tracking range	24 - 28 km
Number of simultaneously engaged targets (radar+optical mode)	2
Reaction time	4-6 s
Engagement zones:	
Missile armament	
range	15,000 - 20,000 m
altitude	5 - 10,000 m
Artillery armament	
range	200 – 4,000 m
altitude	0 – 3,000 m
Max target speed	1,000 m/s
Missile salvo fire	provided
Engagement of ground targets (both by missile and gun armament)	provided
Crew	3



1- Tomahawk cruise missile
2- High-precision weapons carriers
3- Anti-radiation HARM, ALARM missiles
4- Guided aerial bombs
5- Assault aircraft (A-10A)
6- Apache assault helicopters
7- Pantsir-S1 ADGMS

PANTSIR-S1 ADGMS CONFIGURATION BASELINE VERSIONS	
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- rod-shaped elements of the warhead providing for reliable destruction of a wide range of targets

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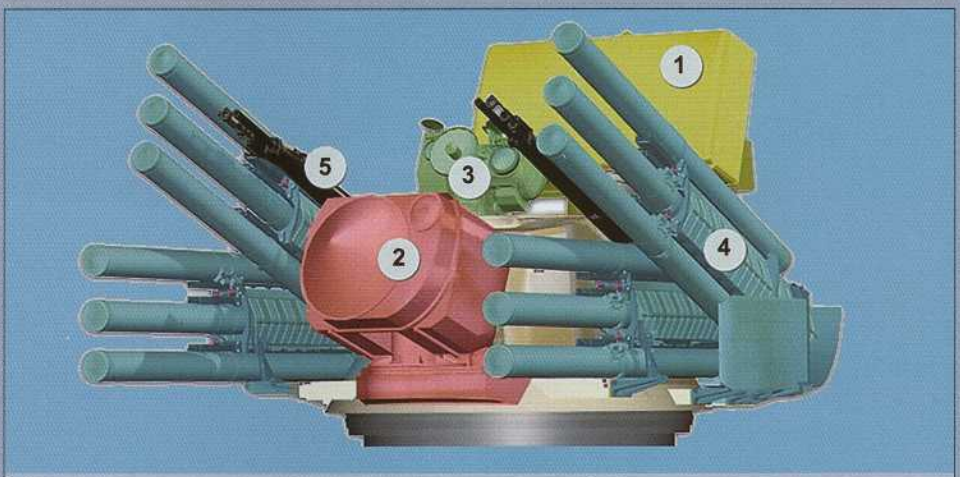
- rod-shaped elements of the warhead providing for reliable destruction of a wide range of targets
- miniaturized design of the onboard equipment.

The Pantsir-S1 air defence gun-missile system incorporates effective gun armament.

At the present time there is no gun worldwide boasting similar characteristics:

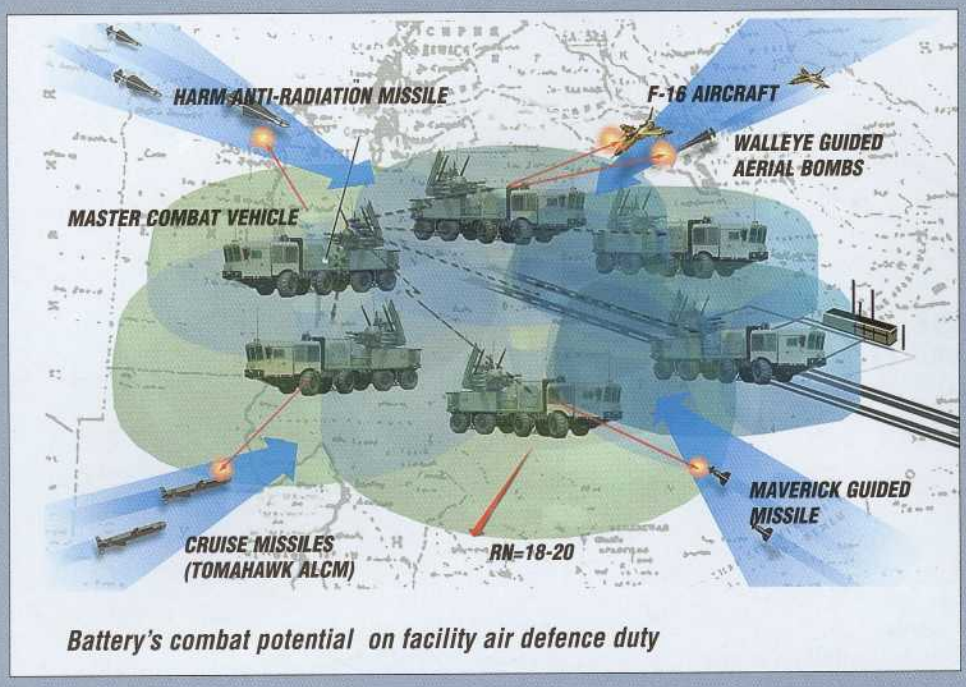
- high rate of firing (5,000 rds/min);
- high intensity fire (long bursts);
- large ammunition load (1,400 rounds).

As one target consumes 150-200 rounds in average for its destruction, total ammunition load of SAM and artillery rounds of the Pantsir-S1 ADGMS can provide 20 target engagements, which is very important for countering high-precision weapons.



PANTSIR-S1 COMBAT VEHICLE WEAPONS AND SENSORS

1. Target search radar
2. Target/missile tracking radar
3. Optronic system
4. SAM launcher unit
5. Automatic gun



Battery's combat potential on facility air defence duty

Depending on local conditions in the combat mission area and combat employment variants the Pantsir-S1 air defence gun-missile system can be operated in the following modes (see table).

Each variant meets the requirements of an assigned combat mission and ensures:

- Full employment of combat capabilities of the armaments
- Reliable protection from all directions
- Continuous interaction with the protected facilities and adjacent units
- Rapid maneuver performance
- Ultimate use of advantageous local terrain features
- Convenience of control
- Electromagnetic compatibility.

The CV's ammunition load is replenished with the help of a transport/loading vehicle carrying 2 sets of ammunition load (24 SAMs and 2800 30-mm rounds).

Continuous combat readiness of the Pantsir-S1 ADGMS is provided by the built-in test equipment in every combat and technical support vehicle.

A classroom and mobile simulators have been developed for training and practicing the CV crews to improve their operational and maintenance skills.

In terms of tactical-technical characteristics the Pantsir-S1 ADGMS will remain a superior weapon system in its class for the next 15-20 years.

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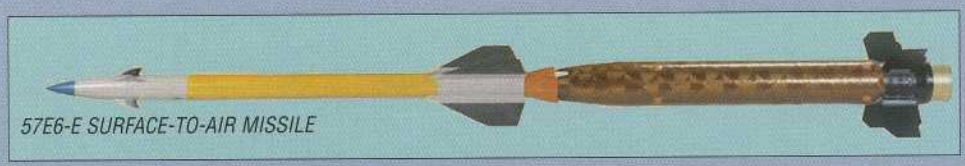

57E6-E SURFACE-TO-AIR MISSILE

PANTSIR-S1 COMBAT EMPLOYMENT VARIANTS

The Pantsir-S1 ADGMS is designed for three typical combat variants based on assumed HPW attacks intensity, characteristics of protected facilities, and terrain features. They are as follows:

- Full combat strength, including 6 combat vehicles and a battery fire-control post
- Scaled-down combat strength, including 3–6 combat vehicles
- Autonomous operation of one combat vehicle

Autonomous combat operation	The Combat Vehicle (CV) operates in stand-alone mode and offers a complete cycle of operation: search, detection, selection of the most dangerous target, target designation, final search, target lock-on, tracking and engagement with missile and gun armaments
Battery command post controlled performance	Combat employment of a battery consisting of one fire control post and up to 6 CVs. Each CV performs all types of combat operations beginning with target designation. Target designation is provided by the battery command post.
Operation according to concept «Master-Slave»	Combat employment of a battery consisting of 6 CVs, one of which is «Master», and others - «Slave». The «Master» CV operates as a Battery Command Post, or Combat Vehicle in the event of autonomous combat operation. Each «Slave» CV receives target designation information from the «Master» CV, and otherwise operates as in the battery command post controlled mode.

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IGLA FOR ISRAEL, STRELETS FOR SYRIA

Events in the beginning of 2005 showed that Russia would not be allowed to sell its arms to the international market quietly.

Immediately after the New Year 2005 some Russian newspapers ran articles under headlines like "Russian Missiles Chill Relations With Israel". All the buzz was about possible sales to Syria of the Russian latest operational-tactical ballistic missile system – Iskander-E, highly precise and capable of engaging targets on the entire territory of Israel. There were also allegations made that Syria expressed its interest in procuring the Favorit and Tor-M1 air defence missile systems.

These articles had numerous repercussions worldwide. Our country was pretty much reprimanded by so called "global freedom fighters" for its military-technical ties with Syria who they believe to be one of the countries sponsoring terrorism. Explanations on the Russian Side only poured oil on the flames. It came out later that Russia planned to sell to Syria purely defensive weapons - air defence missile systems, but not Iskanders at all. It was an issue of delivering 200 Igla man-portable air defence missile systems (MANPADS) by a $20 mln contract planned for signing during the visit of the Syrian President Bashar Asad. But the US and Israel insisted that not all of the self-defence weapons can be allowed for sale to such countries as Syria. They believe that the Igla MANPADS offered for delivery might fall into the hands of Islamic terrorists supported by Syria.

It is known that Russia has been the initiator of strengthening controls over MANPADS proliferation. It has had its negative combat experience in Chechnya actions where MANPADS shot down a great number of helicopters of the Russian military force. It turned out that guerrillas received MANPADS from neighbouring countries who were making some kind of business on arms sales to illegal armed factions. By the way, nobody still knows exactly what happened to hundreds or thousands of the Stinger MANPADS handed over by the USA to Afghan mojahadins in the 1980s. Unfortunately, not all countries are inclined in favour of this initiative of Russia.

The Igla-S is the latest generation MANPADS

On the other hand, it can be inferred from the statistics of Russia's military-technical cooperation with foreign countries that the Igla MANPADS are one of the best-selling arms. Together with the S-300PMU and TOR-M1 air defence missile systems, the Igla weapon conquer the market of anti-air assets. This system belongs to the second-generation MANPADS meeting most stringent requirements to combat effectiveness in harsh jamming environment. In 2004 the Russian army adopted the new MANPADS – Igla-S (sometimes called "Igla-Super") which is much more sophisticated and efficient in countering air threats.

Historically Syria was an ally and an outpost of the USSR in its Middle Eastern policy plans, and also a major recipient of Soviet military hardware. Since it was at a permanent standoff with Israel conducting combat actions against it Syria took delivery of most advanced Soviet-made weapon systems. After the defeat in 1982 when Israel occupied Syrian Golan Heights, Syria demanded that its air defence system should be reinforced. Following the demarche of Syrian authorities the USSR quickly transferred to Syria two regiments of the longest-range air defence missile system at that period – S-200M. Syria was armed, besides the S-200s, with the S-75, S-125, Kvadrat, Strela-1, Strela-10, and Osa-AK surface-to-air missile systems, as well as the ZSU-23-4 self propelled anti-aircraft artillery mounts. These combat assets were supported with contemporary radar and other electronic equipment (radio-altimeters, etc).

After the collapse of the Soviet Union the military-technical cooperation with Syria was frozen. Russia demanded that Syria should recognise its $12-13 bn debt for previously supplied defence materiel. But Syria refused to recognise it as well as to serve it. As a result, the volume of Russia's military-technical cooperation with Syria fell down sharply. In addition, Russian-Syrian relations were affected by other states' interfering. As has admitted the former Foreign Minister Sergei Ivanov, in 2002 Israeli Prime-Minister Sharon turned to Russian leadership with his concerns about delivery to Syria of

a large lot of the IGLA MANPADS. Russian President Putin answered by making decision to stop the transaction - so these systems were not supplied to the region. Cancellation of the contract, thoroughly prepared and signed, was a telling blow to Russian defence enterprises-participators in the Igla design, development and manufacturing, such as the KBM Federal State Unitary Enterprise, ZiD Joint Stock Company, and others. On the eve of the US invasion of Iraq in 2003 Syria again asked Russia to urgently deliver the S-300PMU longer-range air defence missile system, but neither received positive answer: actual refusal was justified by common US-Israeli concerns.

It looks probable that the articles published in Russian press early this January were part of information diversion, in some observers' opinion, timed with the beginning of the visit of the Syrian leader Bashar Asad. At present Syria is among few countries against which the US may plan aggressive actions similar to those in Iraq. So Russia's backing for Syria in such tumultuous period would go against liking of its opponents. During the visit a debt settlement agreement was signed on the writing down of a part of the Syrian foreign debt with Syria approving its remaining part and payments timetable. No major arms delivery contracts were signed, but Bashar Asad confirmed Syria's intentions to procure Russian-made defensive weapons, including air defence systems. Israel strongly reacted and exerted an exceptional pressure on Russian authorities attempting to thwart the planned Iglas' contract. In response President Putin and other officials informed the Israeli Side that Russia did not plan to supply the Iskander-E tactical ballistic missile systems to Syria, but also that delivery of defensive weapons had no restrictions being a sovereign right of either state. Putin declared that Russia would meet its commitment to Syria.

The international defence exhibition that took place in Abu-Dhabi early February this year, soon after Assad's visit, added new intrigue and rumours to Russian-Syrian military-technical cooperation theme. New media reports said that Russians planned to deliver to Syria the Pantsir latest air defence gun-missile systems ordered before only by the United Arab Emirates. Unfortunately this advanced weapon system has not been unveiled to public so far, and nobody knows when its delivery to the UAE will start. According to Israeli militaries, the Pantsir system will be supplied in two-years time for integration into a renewed Syrian air defence system. Its modernisation will, in their opinion, substantially strengthen defence potential of Syrian armed forces.

By mid-February both Russian and Syrian Sides managed to define equipment list of supplies. It turned out that the delivery would involve the Strelets launch units accommodating from 4 to 8 surface-to-air missiles of the Igla MANPADS. The Strelets units would be mounted on automobile chassis precluding their dismounting and transformation into MANPADS.

A set of the Strelets launch units and control equipment was developed by the KBM Machine-building Design Bureau, Kolomna, to provide a remotely-controlled automated single/salvo missile launch capability. The Strelets systems can be mounted on ground-based, airborne and sea-based platforms. Its full-reloading time is 4 min, loaded launch unit weight - 70 kg, control equipment weight - 24 kg.

News about the planned delivery of the Strelets systems was officially confirmed by the Information and Public Relations Department of the Russian Defence Ministry, an unheard-of-before fact. "At present talks are underway on selling to that country a Strelets close-range air defence missile system which has no limitations on its delivery in accordance with international agreements. The launch unit of this system is mounted on tracked or wheeled-type chassis and cannot be employed in a portable version. There is no question whatsoever of deliveries of the Iskander-E tactical ballistic missile systems or improved Igla-SA-18 MANPADS, as reported by the press".

Several years ago Russia refused to deliver to Syria the Igla MANPADS at the request of Israeli Prime Minister Ariel Sharon. It is not improbable that once again Russia will back out of the deal under pressures of its partners in the anti-terror coalition – and there will no contract with Syria.

Yet such docility mars Russia's image in the eyes of Arab buyers of its weapons who will not accept that their military-technical cooperation with Moscow may be controlled from Tel-Aviv and Washington. Whereas arms trade with these

The Strelets SAM launch units can be fitted on any type of chassis and stationary mounts

Exports of Russian-made Igla MANPADS

Recipient country	Item	Prime contractor	Date of contract	Delivery period	Quantity, missiles	Cost, $ mln	Notes
Armenia	Igla	Defence Ministry of Russia	1995	1995-96	200		40 launch units and 200 missiles
Brazil	Igla	KBM, Degtyarev Plant	1994	1994-96	112		56 launch units and 112 missiles. Contract fulfilled
Vietnam	Igla	KBM, Degtyarev Plant	2001	2001-03	250	64	Contract fulfilled
Vietnam	Igla	KBM, Degtyarev Plant	1996	2001-03	72		For arming BPS-500 missile boats
India	Igla	KBM, Degtyarev Plant	December 2000	2001-03	Several hundred systems	ca.50	Contract fulfilled
Malaysia	Igla	KBM, Degtyarev Plant	April 2002	2003	382	48	40 launch units Ë 382 missiles (including Strelets launch units and Djigit launch support pedestals
Mexico	Igla	KBM, Degtyarev Plant	2002	2002	30	2,14	5 Djigit twin launch units and 30 missiles
Singapore	Igla	KBM, Degtyarev Plant	1997	1998	350		30 launch units and 350 missiles
Syria	Igla	KBM, Degtyarev Plant	2003				Contract suspended in 2003
Syria	Strelets	KBM, Degtyarev Plant	2004	2005			Contract cost being negotiated
Ecuador	Igla-1	KBM, Degtyarev Plant	1997	1998	222	14	Contract fulfilled
Republic of Korea	Igla	KBM, Degtyarev Plant	1995	1996	45		For clearing off Russian state debt

countries is the main chance for our arms exports to stay afloat after completion of important arms trade contracts with China and India in the coming years. The best way out of this sensitive situation is to offer to Syria such air defence assets as cannot be used by terrorists. They could be, for example, the Tor-M1 short-range air defence missile system or longer-range anti-air assets. Certainly, our partners may classify these systems as "posing threat if obtained by terrorists". But in fact the Tor-M1 will pose threat to the US and Israeli missiles, if a new attack should be undertaken against another "stronghold of terrorism". This weapon system is not more terrorist-friendly than a tank: one such US ally as Italy was engaged recently in upgrading Syrian armour arsenal. Frankly speaking, the proposed air defence systems are more expensive than the Strelets and more difficult to sell given Syria's poor solvency. But the problem still seems solvable.

Said AMINOV

Israeli alarms at the Iskander-E tactical ballistic missile systems delivery proved false

BRIEF HISTORY OF THE IGLA/IGLA-S DEVELOPMENT

It was in 1971 that the USSR started development of a new generation man-portable air defence missile system (code-named "Igla"). The Igla MANPADS, as a whole, was to be developed by the Kolomna-based KBM machine-building design bureau headed by S.P.Nepobedimy, and the missile's thermal homing head - by the Leningrad-based LOMO optical-mechanical association headed by O.A. Artamonov. Difficulties connected with the complexity of creating jam-resistant seeker ruined the timetable of the seeker's development. Therefore it was decided to take an interim decision and make a simplified version of the Igla system equipped with the seeker from the Strela-3 older-generation MANPADS. That Igla entered service on 11 March 1981. The genuine Igla was successfully tested in 1982 and entered service with the Soviet Army on 23 September 1983. The Igla system boasts high jamming immunity attained thanks to excellent target selectivity against the man-made interference background. This advantageous capability was provided by a new dual-channel optical homing head with the logic unit for a true target selection against clutter. The development of the Igla MANPADS was awarded with the State Prize of the USSR.

In the 1990s the KBM continued improving the Igla MANPADS. As a result, a new Igla-S system entered service with the Russian Army in 2004. The most recent system is substantially more efficient than the Igla and the US Stinger MANPADS. The Igla-S is armed with the increased-weight warhead and a contact-proximity fuse. Its control algorithm ensures selection of the most optimal moment for the warhead's explosion as far as its effectiveness is concerned, both in the contact and non-contact modes. Besides, the Igla-S control system architecture is based on revolutionary (compared to the Igla) principles providing considerably improved missile accuracy. Designers and other specialists of the KBM and its subcontractors were awarded with the State Prize of Russia for the development and introduction into production of the Igla-S MANPADS.

Missile Manufacturer Obtains Certificate

Tactical Missiles Corporation has obtained the Certificate for independent operations in the military-technical cooperation area. The certificate has been handed over to director general of the Corporation Boris Obnosov by director of the Federal Service for Military-Technical Cooperation Mikhail Dmitriyev. In accordance with the certificate Tactical Missiles Corporation has the right to export spare parts independently, bypassing the state intermediary – Rosoboronexport, as well as render repair and maintenance services for missile weapon systems in foreign countries. The corporate top management believes this will help to substantially reduce reaction time to requests for repairs.

Another Market Partition

This June a meeting of the mixed Italian-Russian panel on military-technical cooperation will be held during the Paris Air Show. The panel comprises six groups meeting once a year in Russia and Italy by turns. In the current year the meeting will be in Moscow.

It is expected that the working group on aviation will discuss cooperation and mutual coordination of activities for the Yak-130 in Russia and M346 trainers in Italy.

According to Yakovlev leaders, initial agreements on market partition concerned the joint version Yak/AEM-130. After cancellation of the joint project Russia and Italy started developing their independent national programmes – the Yak-130 and the M346. Therefore the Russian Side thinks it appropriate to come to new agreement on coordination of marketing efforts for these national projects.

Kh-555 Missile Passes Test

The Kh-555 long-range high-accuracy cruise missile has met its next test programme milestone. The news was broken by deputy head of the Armaments Department of the Russian Ministry of Defence Alexander Rakhmanov at the round-table conference on innovations in defence industries held in the Academy of Sciences of Russia. «We have lately demonstrated our highly accurate air-launched missile. It has hit through the window, as pilots say, from a 2,000-km range", said Rakhmanov.

The non-nuclear cruise missile has a launch range of 5,000 km. It started tests in 1999 and was adopted last year by the Russian Strategic Aviation. This is a derivative of the Kh-55 missile, featuring reduced radar cross section, improved navigation system, and a new homing head making this missile a high-accuracy weapon.

The Kh-555 missiles are carried by the Tu-95 and Tu-160 strategic bombers. The Air Force commanders don't exclude possibility of the missile employment in local conflicts and anti-terrorist operations.

Kh-35 Missile Aimed At Export

In the end of this April the Kh-35 antiship missile made a successful test firing at one of the Russian test ranges. The missile was carried by an export version of the Il-38SD naval aircraft. The test mission was to check missile's interface with the systems onboard the carrier aircraft. Besides military experts the test was attended by a group of specialists from the experimental design bureau of Tactical Missiles Corporation.

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1/4 page	9,500

Deadline for advertising materials submission – July 15, 2005.

Aviasalony Mira (World Airshows): The only Russian-language bimonthly magazine published by Intervestnik Publishing House, Moscow, since 1999, reviews new aerospace technologies and services, programmes of international cooperation, trends in the Russian aerospace markets. Target audiences are Russian/CIS legislative and executive bodies, ministries of defence, aircraft design bureaus and manufacturing plants, airline companies, associated industries, banks, financial and insurance companies, etc.

Distribution: The printout of 5,000 copies with NTS/ABC certification is distributed in Russia/CIS by direct mail to VIPs (43%), on paid subscription (26%) and by retail sale (21%), as well as by handing over (10%) to Russian-reading exhibitors, delegates and visitors to international air shows.

www.aviasalon.com

MAKS 2005

INTERNATIONAL AVIATION AND SPACE SALON

MOSCOW ZHUKOVSKY 16-21 AUGUST

Daily Newspaper «MAKS NEWS» Advertising Rates

Pages	Price, US$
1 page (A3 format)	3,000
1/2 page (A4 format)	1,650

Deadline for advertising materials submission – July 15, 2005.

Print-run - 5,000 copies
4 issues (16 august, 17 august, 18 august, 19 august)
Format: A3
Free distribution during the Show to the exhibitors and official delegations, stands and shalet.

Technical Requirements

Film requirements: Colour separated positive films
Trim size: 215x285 mm
Screen Size: 175 lpi, color separation under Euroscale specification
Digital version requirements: Apple/PC computer file made in QuarkXPress or Adobe Illustrator, accompanied with a hard copy colour proof. The preferred format of images is .tiff (300 dpi) or .eps.

Place Your Advertisement at MAKS 2005!

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E-mail: af@airfleet.ru

INTERVESTNIK
PUBLISHING HOUSE

FIDAE 2006

Santiago, Chile; March 27 - April 2, 2006

- We are pleased to inform you that for the first time in the 25-year-long history of FIDAE aerospace exhibitions its Organising Committee entrusts publication of the FIDAE 2006 Exhibitor Catalogue to the largest Russian publishing house, specialising in technical publications – Intervestnik, Moscow.

- Intervestnik Publishing House is addressing its invitation to all participants to the FIDAE 2006 Air Show, as well as subjects of the aerospace market who are eager to promote their businesses in Latin America, to run their advertising materials in the FIDAE 2006 Air Show official catalogue.

- The mission of FIDAE, as stated by the Organizing Committee, is "to promote actual business opportunities to national and international companies related to aerospace and defence, through the satisfaction of commercial needs, facilitating the encounter with potential customers, providing high-quality products and services and a constant personalized assistance, which features FIDAE as the best aerospace and defence fair in the region".

FIDAE 2006 Official Catalogue

The Catalogue is intended for participants and business visitors to the FIDAE 2006 Air Show. We aim to publish it as a Latin American aviation reference book containing not only information about all the participants to the Air Show but also, for the first time, detailed data on all types of aircraft operated in Latin America shown by countries and types.

Catalogue's Technical Data

Printing Date	March 22, 2006
Languages	Spanish/English
Printout	1,500 copies
Format	210 x 280 mm
Deadline for advertising materials	January 10, 2006

Technical Requirements

Film requirements: Colour separated positive films
Trim size: 210 x 280 mm (Catalogue); 215x285 mm (Air Fleet magazine)
Screen Size: 175 lpi, color separation under Euroscale specification
Digital version requirements: Apple/PC computer file made in QuarkXPress or Adobe Illustrator, accompanied with a hard copy colour proof. The preferred format of images is .tiff (300 dpi) or .eps.

Place your advertisement in

INTERNATIONAL AIR & SPACE FAIR

FIDAE 2006

Advertisement Rates for Official Catalogue

Pages	Full colour (US$)	Black and white (US$)
Outside back cover	7,800	-
Inside front cover	6,700	-
Inside back cover	5,400	-
Two-page spread	7,400	-
One full page	4,600	3,200
1/2 page	2,700	2,000
1/4 page	1,800	1,200

Advertisement Rates for Air Fleet's Special Issue

Pages	Full colour (US$)
Outside back cover	10,000
Inside front cover	9,000
Inside back cover	8,000
Two-page spread	8,000
One full page	4,000
1/2 page	2,700
1/4 page	1,400

SPECIAL OFFER

Clients who book advertisements both in the FIDAE 2006 Official Catalogue and Air Fleet magazine No 2, 2006 (Special Spanish-language Issue) can be given discounts of up to 40% for the publications in the magazine.

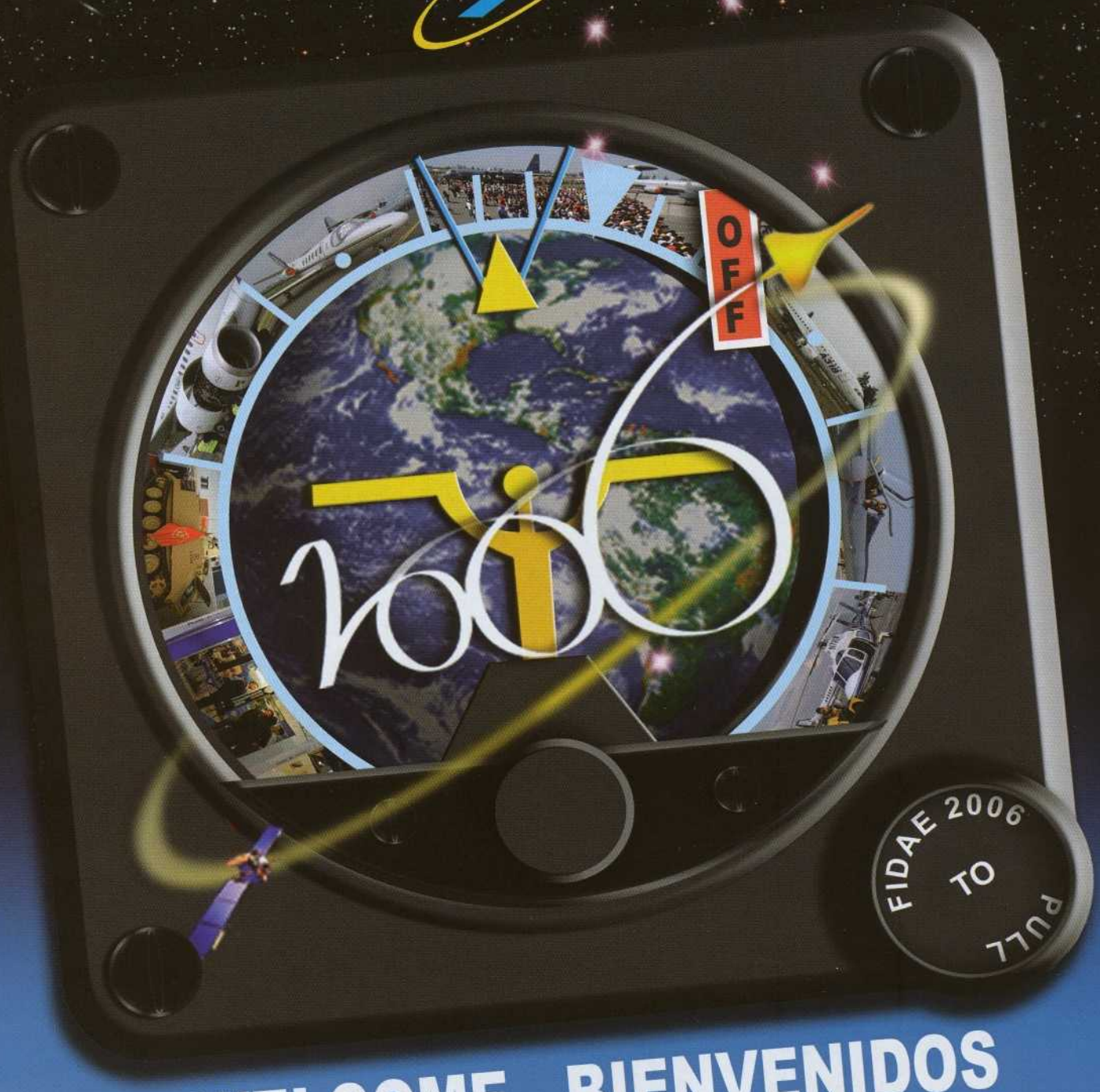
Circulation of Air Fleet magazine (FIDAE's special issue) – 5,000 copies

Intervestnik Publishing House
P.O. Box 77, Moscow 125057, Russia
Phone: +7 (095) 926-52-11
Fax: +7 (095) 151-61-50
E-mail: af@airfleet.ru

official catalogue of FIDAE 2006!

INTERNATIONAL AIR & SPACE FAIR

FIDAE 2006



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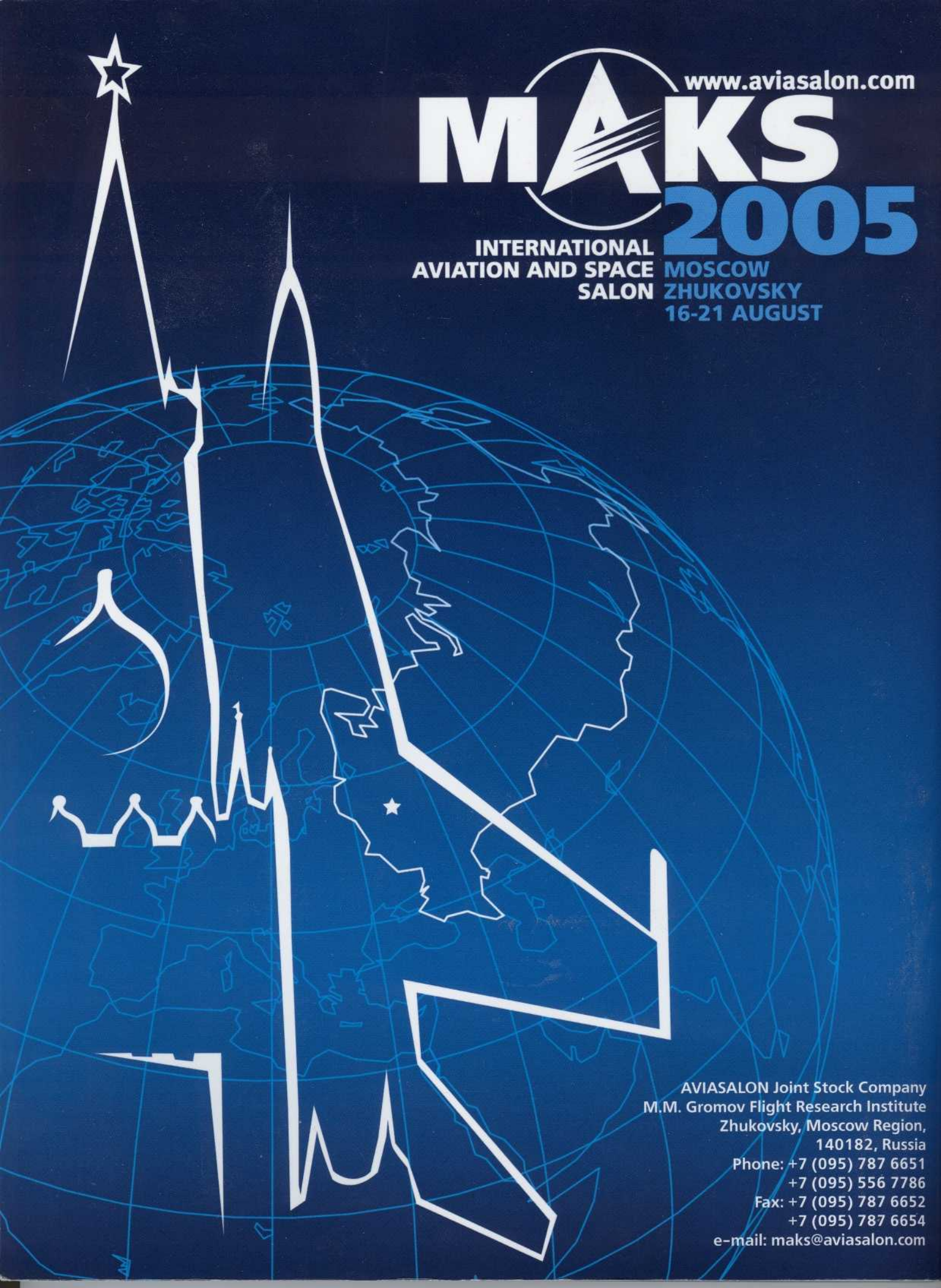

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